University Bulletin

Undergraduate Degree Programs

Primary Navigation

Penn State University Park

University Park campus, located in the municipality of State College in central Pennsylvania, is the largest of the Penn State campuses and the administrative hub of the University.

The diverse community hosts students from all fifty states and more than one hundred countries, with a typical annual student population of more than 40,000.

The campus houses eleven of the University's undergraduate colleges, the Graduate School, Schreyer Honors College, and a campus of Penn State Dickinson School of Law. It is the base for the University Libraries, which serve all the campuses in the Commonwealth.

The Nittany Lions football team plays at Beaver Stadium on the campus and other Big Ten sporting events are held in the playing fields and in the Bryce Jordan Center, a multipurpose arena for University ceremonies such as commencement, sporting events, and entertainment.

Baccalaureate Degrees

Accounting

University Park, Smeal College of Business (ACCTG)

PROFESSOR STEVEN HUDDART, Chair of the Department of Accounting

This major prepares students for careers in public, corporate, not-for-profit, and governmental accounting and also provides an appropriate background for those planning to enter law school or graduate school. Accountants develop and interpret historical and prospective financial data required for decision-making by managers, investors, regulators, and other stakeholders. To perform their functions, accountants must synthesize both numerical and qualitative information, communicate it clearly, and function effectively as individuals and in teams. The field of Accounting is diverse and offers students the opportunity to be generalists or concentrate in one of the following:

Corporate Control & Financial Management - Courses in this concentration prepare students for positions in industry, government, and business advisory services doing financial planning, analysis, control, and decision support. Students can obtain such designations as Certified Management Accountant (CMA). Management accountants provide forecasts, compute costs and benefits, perform variance analysis, and review and monitor performance. Managerial accountants also design systems that provide information to decision makers.

Internal Auditing & Assessment - Courses in this concentration prepare students for positions in industry and government as internal auditors. Students can obtain such designations as Certified Internal Auditor (CIA). Internal auditors are employed by the organization they audit. Internal auditing is a systematic approach to evaluating and improving the effectiveness of risk management, control, and governance processes. Internal auditors also review compliance with standards and assess the organization's risks.

Public Accounting - Public accounting is carried on by independent practitioners, most of whom are Certified Public Accountants (CPAs). In addition to statutory audits, CPAs render other assurance, tax, and management advisory services. To be licensed as a CPA in nearly every state, including Pennsylvania, individuals must complete 150 credit-hours of education, pass a demanding professional examination, and meet certain experience requirements. One way to accomplish this is to enroll in the Integrated B.S. in Accounting and Master of Accounting Program.

Entrance Requirement: To be eligible for entrance into the Accounting (ACCTG) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4)[1]; ECON 102 GS(3); SCM 200 GQ(4)[1]; STAT 200 GQ(4)[1]; ENGL 015 GWS(3) or ENGL 030 GWS(3); and MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1]; FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1]. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business Web site [http://www.smeal.psu.edu/].

For the B.S. degree in Accounting, a minimum of 120 credits is required with at least 15 credits at the 400 level.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 11 credits

REQUIREMENTS FOR THE MAJOR: 76 credits
(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses)

PRESCRIBED COURSES (52 credits)
ACCTG 211(4)[1], ECON 102 GS(3), FIN 301(3)[1], MGMT 301(3)[1], MKTG 301(3)[1] (Sem: 1-4)
B A 342(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3)[1], MIS 204(3), SCM 301(3), (Sem: 5-6)
ACCTG 403W(3), ACCTG 404(3), ACCTG 405(3)[1], ACCTG 471(3)[1], ACCTG 472(3)[1], B A 411(3) (Sem: 5-8)

ADDITIONAL COURSES (14 credits)
MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1] (Sem: 1-2)
SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1] (Sem: 1-2)
Select 6 credits from the following: ACCTG 406(3), ACCTG 432(3), ACCTG 440(3), ACCTG 473(3), ACCTG 481(3), ACCTG 483(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 4 credits: Attainment of 12th credit level proficiency in a single foreign language. Proficiency must be demonstrated by either examination or course work. (Sem: 1-4)
Select 6 credits of supporting coursework. See Department List. (Sem: 5-8)

Integrated B.S. in Accounting and Masters in Accounting Program
The Department of Accounting offers an integrated program allowing students to receive a B.S. in Accounting and Master of Accounting (M.Acc.) degrees within a five-year period. Students typically are admitted into the integrated program in the spring of the second year of the undergraduate program and the program is completed in the subsequent three years. The program is designed to meet the educational requirements for becoming a certified public accountant in Pennsylvania as well as most other states. Certified public accountants conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement. In addition, the program is appropriate for students having an interest in entering law school and graduate programs in business, such as M.B.A. programs or doctoral programs.

Admissions Requirements
Students will generally apply for the program in the spring of their second year of undergraduate study. To apply for the program students must:
(1) be enrolled in the Smeal College of Business or Division of Undergraduate Studies and intend to complete the entrance-to-major requirements by the end of the spring semester in which they apply
and
(2) complete a Graduate School application for graduate study.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have grade-point average of at least 3.20 on Penn State’s grading scale of A (4.00) to D (1.00).

In addition, the Department may request an interview with an applicant, or require a GMAT exam or other exam. Admissions decisions will be based upon the student’s application, undergraduate record, SAT scores and, if applicable, interviews and examination results.

Admitted students must have completed ACCTG 211 with superior performance by the end of the spring semester in which they apply for admission to the program. A student who has not satisfied this requirement by the admissions deadline may be provisionally admitted pending completion of ACCTG 211 with a superior performance.

Degree Requirements
Students must complete the requirements for a B.S. in accounting with the following alterations:
Some of prescribed courses for the B.S. must be taken in sections that are available only to students enrolled in the program. These prescribed courses, which all count toward the undergraduate degree in accounting, are: ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, and ACCTG 472.
The student need not satisfy the requirement that 6 credit hours be completed from the following list of courses: ACCTG 406, ACCTG 432, ACCTG 473, and ACCTG 481.
The following courses cannot be used to satisfy the degree requirements of the integrated program: ACCTG 406, ACCTG 410, ACCTG 411, ACCTG 422, ACCTG 450, ACCTG 473, and ACCTG 481.
Students must complete the Master of Accounting Requirements, which total 30 credit hours of graduate instruction, in addition to completing 120 credit hours of undergraduate instruction.

The following courses, totaling 9 credit hours, will double-count towards both the B.S. and Master of Accounting degrees: B LAW 444(3), FIN 531(3), and ACCTG 881(3).

Students must complete a minimum of 30 credits hours of graduate instruction over and above the 120 credit hours required of the B.S. degree in accounting. All 30 of these credit hours must be earned in 400-level, 500-level, or 800-level courses. At least 18 of the 30 credit hours must be earned in 500-level and 800-level courses, and at least 6 of the 30 credit hours must be earned in 500-level courses.

Students must complete the following required courses as part of the 30 credit hours of graduate instruction:
ACCTG 432(3), ACCTG 440(3), ACCTG 803(3), ACCTG 806(3), ACCTG 873(3), ACCTG 881(3), B A 517(3), B LAW 444(3), FIN 531(3).

These courses must be taken in sections that are available only to students enrolled in the integrated program. Note that these required courses satisfy 27 of the 30 credit hour minimum. In addition, after completing these courses, the student will have satisfied the requirement that 18 credit hours must be earned in 500-level or 800-level courses and the requirement that 6 credit hours must be earned in 500-level courses.

Students must have satisfactory academic performance to maintain enrollment in the program. A grade point average of 3.0 in the 30 credit hours of graduate instruction is required to receive the master’s degree.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-06-026
Review Date: 04/09/2013

Advertising/Public Relations

University Park, College of Communications (AD PR)
World Campus, Strategic Communications option only

PROFESSOR ROBERT A. BAUKUS, Head, Department of Advertising/Public Relations

This major is designed to provide a balance of theory, research, and practice. The course sequence provides professional skills courses in conjunction with applied theory and critical evaluative courses. Students develop an understanding of the role and effect of advertising and public relations within the business, social, and political arenas. Students develop abilities and skills that prepare them for a wide range of professional opportunities that include: media planning and relations, research, client services. Analytical abilities are equally stressed throughout the curriculum. Critical thinking skills, creative problem-solving, and the need to justify decisions are developed. Theory and practice from a wide range of disciplines including business, behavioral sciences, and applied statistics are used to equip the students to make informed decisions in a dynamic environment.

ADVERTISING OPTION: All courses in the advertising major emphasize the critical importance of integrated communication. The objective of the curriculum is to prepare students for entry-level opportunities in the advertising profession and to prepare for eventual managerial roles where an understanding of integrated communication concepts is essential.

The program reflects an integrated marketing communications approach to the design implementation and evaluation of advertising messages. In addition to mastering the core professional courses, students are expected to have an understanding of the convergence of mass communication theory and practice and are encouraged to select from courses in communication theory, communication law, mass media history, ethics, and the impact of advertising and public relations on society.

PUBLIC RELATIONS OPTION: The public relations curriculum prepares students for the challenges of public relations practice in a highly competitive, technological, multicultural, and global environment. In their course of study, students study the role and function of public relations in building cooperative mutually beneficial relations between organizations and their constituent publics through understanding, credibility, and trust.

Students complete a core set of courses that includes news writing, introduction to public relations, public relations methods, mass communication research, and public relations problems (campaigns).

Because of the critical importance of journalistic writing skills and an understanding of news media ethics, public relations majors are encouraged to take additional journalism courses to fulfill their communication electives.

Advertising and public relations students are encouraged to choose a minor from outside the College of Communications. The majority of majors select minors in business, English, sociology, psychology, political science, information systems and statistical analysis, foreign language, and speech communication.

STRATEGIC COMMUNICATIONS OPTION: This online program is designed to be only available to World Campus students.

Strategic communications refer to a group of techniques used to design, implement, and evaluate the impact of messages on selected groups of people. The goal is to find solutions to complex advertising and public relations problems in the corporate, non-profit, and government sectors at both the domestic and international level.

The Strategic Communications online option explores the theories, methods, and tools used to structure persuasive messages. The option includes an overview of strategic communications principles and concepts that sets the stage for more advanced studies. Students learn about research and analytic techniques used to design and implement effective communication campaigns that are delivered via traditional and new media options. The use of digital technology and
social media is emphasized. The program examines the dynamics of the political, legal, social, cultural environments that interact to define a communication task or problem. Students also learn techniques to benchmark and evaluate the effectiveness of strategic communications programs and understand how they apply to internal and external constituencies. Students studying strategic communications will refine their critical thinking skills and explore the nature and source of the information message content, medium of delivery, and the evaluation of the impact of the message on targeted groups.

An important aspect of the program is the examination of the ethical implications of strategic communication practices used in the marketing, advertising and public relations arena. Students will develop a framework that will help them to understand and evaluate supporters and critics of strategic communications practices.

Students must select at least 80 credits in courses outside the College of Communications, including at least 65 in the liberal arts and sciences.

For the B.A. degree in Advertising/Public Relations, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 26 credits

COLLEGE OF COMMUNICATIONS BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 35 credits[1]
(This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 14 credits

PRESCRIBED COURSES (11 credits)
COMM 160(1), ECON 102 GS(3), PSYCH 100 GS(3), STAT 200 GQ(4) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits of COMM courses (other than COMM 100 GS or COMM 120) (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 21 credits

ADVERTISING OPTION:

PRESCRIBED COURSES (15 credits)
COMM 320(3) (Sem: 3-6)
COMM 420(3), COMM 421W(3), COMM 422(3) (Sem: 5-7)
COMM 424(3) (Sem: 7-8)

ADDITIONAL COURSES (6 credits)

PUBLIC RELATIONS OPTION:

PRESCRIBED COURSES (15 credits)
COMM 260W(3) (Sem: 3-4)
COMM 370(3) (Sem: 5-6)
COMM 420(3), COMM 471(3) (Sem: 5-8)
COMM 473(3) (Sem: 7-8)

ADDITIONAL COURSES (6 credits)

STRATEGIC COMMUNICATIONS OPTION:

PRESCRIBED COURSES (18 credits)

ADDITIONAL COURSES (3 credits)
Select 3 credits from CC 401(3), CC 402(3), CC 403W(3), COMM 403(3), COMM 405(3), COMM 409(3), COMM 412(3), COMM 419 US;IL(3), or COMM 495(3) (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2013
Aerospace Engineering

University Park, College of Engineering (AERSP)

PROFESSOR GEORGE A. LESIEUTRE, Head, Department of Aerospace Engineering

This major emphasizes the analysis, design, and operation of aircraft and spacecraft. Students learn the theories and practices in the fundamental subjects of aeronautics, astronautics, aerodynamics and fluid dynamics, aerospace materials and structures, dynamics and automatic control, aircraft stability and control and/or orbital and attitude dynamics and control, air-breathing and rocket propulsion, aircraft systems design and/or spacecraft systems design. All of these place significant weight on the development and use of teamwork and communications skills for effective problem-solving. Graduates in aerospace engineering find employment in the customary settings such as government laboratories, large and small aerospace firms, and in nontraditional positions that also require the use of systems-engineering approaches to problem-solving; they can also pursue graduate study in aerospace engineering and related fields.

Program Educational Objectives:
Two to three years after obtaining a B.S. in aerospace engineering, graduates will be
1. employed in the customary settings such as government laboratories, large and small aerospace firms, and nontraditional positions that also require the use of systems engineering approaches to problems-solving, or
2. pursuing graduate study in aerospace engineering and related fields.

Program Outcomes (Student Outcomes)
The undergraduate program will provide students with the
a.) ability to apply knowledge of mathematics, science and engineering to foundational subjects of aerospace engineering (aeronautics, astronautics, aerodynamics and fluid dynamics, aerospace materials and structures, dynamics and automatic control, stability and control of aircraft and/or spacecraft, air-breathing and rocket propulsion, and aircraft systems design and/or spacecraft systems design),
b.) ability to design and conduct experiments, analyze and interpret data in aerodynamics, propulsion, structures, or control systems,
c.) ability to design a system, component or process, integrating knowledge from relevant topics in astronautics and aeronautics, to meet desired needs in aircraft systems and/or in spacecraft systems,
d.) ability to function on multi-disciplinary teams,
e.) ability to identify, formulate, and solve engineering problems,
f.) understanding of professional and ethical responsibility,
g.) ability to communicate effectively,
h.) broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
i.) recognition of the need for, and an ability to engage in life-long learning,
j.) knowledge of contemporary issues,
k.) ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, and
l.) knowledge in all subjects in Category I or in Category II, and in some subjects in the other category:
(Category I: aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control),
(Category II: orbital mechanics, space environment, attitude determination and control, telecommunications, space structures, and rocket propulsion).
The first two years of study are similar to those in other engineering majors and provide students with a basic education for the engineering profession. Students need to complete E MCH 212, CMPSC 201, MATH 220, MATH 230, and MATH 250 prior to the start of the junior year in order to meet graduation requirements in the following two years.
Six of the nine technical-elective credits taken in the senior year must be aerospace engineering courses.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.
For the B.S. degree in Aerospace Engineering, a minimum of 131 credits is required. This baccalaureate program in Aerospace Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., [www.abet.org.](http://www.abet.org)

*Scheduling Recommendation by Semester Standing given like (Sem:1-2)*

**GENERAL EDUCATION:** 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**REQUIREMENTS FOR THE MAJOR:** 113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

**PRESCRIBED COURSES** (72 credits)
CHEM 110 GN(3)[1], EDSGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1] (Sem: 1-2)
E MCH 212(3)[1], M E 201(3), MATH 220 GQ(2-3), MATH 230(4), MATH 250(3)[1], PHYS 212 GN(4)[1], PHYS 214 GN(2) (Sem: 3-4)
AERSP 301(3)[1], AERSP 304(3), AERSP 305W(3), AERSP 306(3)[1], AERSP 309(3)[1], AERSP 311(3)[1], AERSP 312(3), AERSP 313(3)[1], E MCH 315(2), E MCH 316(1) (Sem: 5-6)
AERSP 410(3), ENGL 202C GWS(3) (Sem: 7-8)

**ADDITIONAL COURSES** (29 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), or ECON 014 GS(3) (Sem: 1-2)
Select 5 credits from E MCH 210(5), E MCH 211(3), E MCH 213(3) (Sem: 3-4)
ENGL 015 GWS(3) or ENGL 030 WGS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 3-4)
AERSP 401A(3), AERSP 401B(3); or AERSP 402A(3), AERSP 402B(3) (Sem: 7-8)
AERSP 413(3) or AERSP 450(3) (Sem: 7-8)
AERSP 440(3), E E 210(3), or E E 212(4) (Sem: 7-8)

**SUPPORTING COURSES AND RELATED AREAS** (12 credits)
Select 9 credits of Aerospace Technical Elective (ATE) courses from department list. (Sem: 7-8)
Select 3 credits of Limited Elective (LE) courses from department list. (Sem: 7-8)
(Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of LE and 3 credits of GHA.)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2006
Blue Sheet Item #: 34-05-056
Review Date: 2/28/06
R & T: Approved 5/24/2013
UCA Revision #1: 8/2/06
UCA Revision #2: 7/26/07
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### African American Studies

*University Park, College of the Liberal Arts (AA ST)*

**PROFESSOR PAUL C. TAYLOR, Head**

This major helps students achieve a critical understanding of the forms of knowledge, culture, and social organization that African-Americans have produced, and of the social conditions that have supported and constrained this work. Using interdisciplinary approaches as well as methods drawn from the traditional disciplines, the major exposes students to the ideas, institutions, movements, and practices that African-American peoples have used to survive and shape the modern world. The African American Studies curriculum promotes the critical faculties, cultural competencies, and historical sensibilities of its students, and thereby equips them for success in graduate school, professional school, and the workplace.

For the B.A. degree in African American Studies, a minimum of 125 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

*Scheduling Recommendation by Semester Standing given like (Sem:1-2)*
GENERAL EDUCATION: 45 credits
(4-10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in the this bulletin)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 23-29 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits [1]
(This includes 3-9 credits of General Education courses: 0-6 credits of GS courses; and 3 credits of GH courses)

PRESCRIBED COURSES (9 credits)
AF AM 100 GS;US(3), AF AM 197 GS; IL(3), HIST 152 GH;US;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (27 credits)
Select 3 credits from AF AM 101 GH;US(3), AF AM 102 GH;US(3), AF AM 103 GH;US(3) (Sem: 1-4)
Select 3 credits from AF AM 197 GH;US(3) or SOC 207 (3) (recommended for Political Science, Sociology and HHD-related double majors) (Sem: 1-4)
Select 3 credits from AF AM 401(3), AF AM 494(3), AF AM 495(3) (Sem: 4-8)
Select 12 credits from one of the following four areas of concentration, and 6 more credits from any of the other areas. A minimum of 12 credits should be AF AM courses, and at least 12 of these credits must be at the 400-level or above.

If you wish to receive credit for courses other than the ones noted below, you must seek permission from the AFAM undergraduate director.

1. Gender and Sexuality
AF AM 101 GH;US(3), AF AM 102 GH;US(3), AF AM 103 GH;US(3); AFR 202 GS;IL(3) (Sem: 1-4)
AF AM 364 GS;US(3), AF AM 410(3), AF AM 416(3) (Sem: 4-8)
Select 3 credits at the 400-level in consultation with your adviser (Sem: 4-8)

2. Humanities
AF AM 147 GH;US(3), AF AM 145 GH;US;IL(3), AF AM 146 GH;US(3), AF AM 208 GA;US;IL(3), AF AM 210 GH;US(3), AF AM 212 US(3), AF AM 235 US(3) (Sem: 1-4)
AF AM 412(3), AF AM 422(3), AF AM 460(3), AF AM 465(3), AF AM 469(3) (Sem: 4-8)

3. Social Sciences and Community Development
SOC 119 GS;US(3), PL SC 123 GS;US;IL(3) (Sem: 1-4)

4. Migration and Diaspora
AF AM 102 GH;US(3), AF AM 132 IL(3), AF AM 211 GH;US;IL(3), AF AM 250 GH;IL(3), AFR 110 GS;IL(3), AF 192 GH;IL(3) (Sem: 1-4)
AF AM 431(3), AF AM 432(3), AFR 440(3), AFR 497(3), PL SC 453(3) (Sem 4-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-05-039
Review Date: 02/21/2012

PROGRAM CURRENTLY ON HOLD;
NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: May 30, 2012

African and African American Studies
University Park, College of the Liberal Arts (AASBA)
PROFESSOR IKUBOLAJEH LOGAN, Interim Head
This interdisciplinary major is designed to give students an integrated and critical understanding of the experiences and contributions of peoples of African descent. Students are encouraged to do research and evaluate the relationship between the political, social, and economic developments in Africa and the African Diaspora. Two options are available within the major and are described here.
AFRICAN AMERICAN STUDIES OPTION:
This option provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field along with those adopted from the various disciplines. Students are also made aware of the potential to apply knowledge to discern better approaches for solving social, political, and economic problems. The curriculum also promotes greater understanding of the relationship between African American and other ethnic groups in the shaping of American society and culture.

Focus Areas: The African American Studies Option has three focus areas, which are described below.

1. **History Perspective**: While stressing the interdisciplinary nature of the field, this focus allows students to concentrate on the historical experience of the African Americans, including their political, social, and economic relations with other ethnic groups, as well as the shifting historical contexts in which they have contested and shaped the evolution of American society.

2. **Social Sciences and Community Development**: This focus area allows students to concentrate on contemporary political and economic experiences of African Americans as well as on public policy issues that pertain to the economic, political, and social engagement of African Americans in the search for equality in American society.

3. **Cultural and Gender Perspective**: This focus area allows students to concentrate on culture and gender in historical and contemporary terms.

AFRICAN STUDIES OPTION:
This option provides students with the opportunity to examine the geographical, cultural, historical, political, and economic aspects of Africa. This option has two focus areas as described below.

1. **Humanities Perspective**: This focus area enables students to concentrate on the history and culture of African societies and the evolution of Africa in world history.

2. **Social Science Perspective**: This focus area enables students to concentrate on political and economic developments, including state building and ethnic relations, development strategies, and Africa’s position in the global system.

LAW AND SOCIAL JUSTICE OPTION:
This multi-disciplinary program would provide students with the opportunity to study the politics, culture, economics, and history of African Americans in our society and link this understanding with an in depth study of criminal justice and the legal system. Issues that students will focus on will be areas such as, Are African Americans discriminated against in criminal justice decision-making? What is the historic connection between race and punishment in the US legal system? How do issues of class, race and gender impact policy decisions about crime and punishment? What is the socioeconomic impact of high incarceration rates on the African American community? The program is designed to encourage students to think systematically about the relationship among public policy, the criminal justice system, and shifting notions of social justice that have characterized debates over the workings and goals of the prison system in American life and thought.

For the B.A. degree in African and African American Studies, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-9 credits of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 9-18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 45 credits[11]
(This includes 0-9 credits of General Education courses: African American Studies Option -- 0-3 credits of GA courses; 0-3 credits of GH courses; 0-3 credits of GS courses. African Studies Option -- 0-3 credits of GH courses; 0-3 credits of GS courses. Law and Social Justice Option -- 0-3 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 12 credits

PRESCRIBED COURSES (12 credits)
AAA S 110 GS;IL(3), AF AM 100 GS;US(3), AF AM/HIST 211 GH/US;IL(3), SOC 207(3) (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 33 credits

AFRICAN AMERICAN STUDIES OPTION: (33 credits)

PRESCRIBED COURSES (9 credits)
AAA S/WMNST 101 GH;US(3), AAA S/SOC/WMNST 103 US(3) (Sem: 1-4)
AAA S 401(3) (Sem: 5-8)

ADDITIONAL COURSES (24 credits)
Select 24 credits from one of the following three areas of concentration. A minimum of 12 credits should be AAA S courses, and at least 12 of these credits must be at the 400 level or above.

1. **History Perspective:**

2. **Social Sciences and Community Development:**

3. **Cultural and Gender Perspective:**

**AFRICAN STUDIES OPTION:** (33 credits)

**PRESCRIBED COURSES** (12 credits)
AFR/HIST 191 GH;IL(3), AFR/HIST 192 GH;IL(3) (Sem: 1-4)
AAA S 400(3), AFR/PL SC 454 IL(3) (Sem: 5-8)

**ADDITIONAL COURSES** (21 credits)
Select 21 credits from one of the following two areas of concentration. A minimum of 12 credits should be AAA S courses, and at least 12 of these credits must be at the 400 level or above.

1. **Humanities Perspective:**
   AFR 202 GS;IL(3), CMLIT 003 GH;IL(3), SWA 001(4), SWA 002(4) (Sem: 1-4)
   AAA S 404(3), AF AM 431US;IL(3), AF AM/HIST 465 US(3), ANTH 447 IL(3), CMLIT 422 IL(3), CMLIT 423 IL(3), FR 458 IL(3), HIST 479 IL(3), R SOC/WMNST 420 US;IL(3) (Sem: 5-8)

2. **Social Science Perspective:**
   AAA S 202 GS;IL(3), SWA 001(4), SWA 002(4) (Sem: 1-4)

**LAW AND SOCIAL JUSTICE OPTION:** (33 credits)

**PRESCRIBED COURSES** (18 credits)
AF AM/HIST 210 GH;US(3), CRIMJ/CRIM/SOC 012 GS(3), CRIM 100(3), CRIMJ/CRIM 113(3) (Sem: 1-4)
AF AM 401(3), CRIM 451 US(3) (Sem: 5-8)

**ADDITIONAL COURSES** (15 credits)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

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**NOT ACCEPTING NEW STUDENTS**

**Begin Date of Enrollment Hold: February 17, 2012**

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**African and African American Studies**

*University Park, College of the Liberal Arts (AASBS)*

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

**PROFESSOR IKUBOLA JE LOGAN, Interim Head**

This interdisciplinary major is designed to give students an integrated and critical understanding of the experiences and contributions of peoples of African descent. Students are encouraged to do research and evaluate the relationship between the political, social, and economic developments in Africa and the African Diaspora. An African American Studies Option, African Studies Option, and a Law and Social Justice Option are available within the major. The
methodology requirements of the proposed program would enable our students to engage in social science research. It would also prepare them better for graduate programs in the social sciences.

AFRICAN AMERICAN STUDIES OPTION: This emphasis provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field along with those adopted from the various disciplines. Students are also made aware of the potential to apply this knowledge to the solution of social, political, and economic problems. The curriculum also promotes greater understanding of the relationship between African American and other ethnic groups in the shaping of American society and culture.

AFRICAN STUDIES OPTION: This option provides students with the opportunity to examine the geographical, cultural, historical, political, and economic aspects of Africa.

LAW AND SOCIAL JUSTICE OPTION: This multi-disciplinary program would provide students with the opportunity to study the politics, culture, economics, and history of African Americans in our society and link this understanding with an in-depth study of criminal justice and the legal system. Issues that students will focus on will be areas such as, Are African Americans discriminated against in criminal justice decision-making? What is the historic connection between race and punishment in the US legal system? How do issues of class, race, and gender impact policy decisions about crime and punishment? What is the socioeconomic impact of high incarceration rates on the African American community? The program is designed to encourage students to think systematically about the relationship among public policy, the criminal justice system, and shifting notions of social justice that have characterized debates over the workings and goals of the prison system in American life and thought. The proposed program would enable us to foster a cadre of students who will be particularly suited to pursue graduate work in the area.

For the B.S. degree in African and African American Studies, a minimum of 120 credits is required.

For the B.S. degree in African and African American Studies, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 Credits
(4-10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 20 credits

REQUIREMENTS FOR THE MAJOR: 64-65 credits[1]
(This includes 4-10 credits of General Education courses: 4 credits of GQ courses; 6 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 16-17 credits

PRESCRIBED COURSES (13 credits)
AAA S 110 GS;IL(3), AF AM 100 GS;US(3), SOC 207(3), STAT 200(4) (Sem: 1-4)

ADDITIONAL COURSES (3-4 credits)
SOC 470(4) or PL SC 309(3) (Sem: 5-8)

AFRICAN AMERICAN STUDIES OPTION: (48 credits)

PRESCRIBED COURSES (9 credits)
AF AM 101 GH;US;IL(3), AAA S/HIST 211 GH;IL(3) (Sem: 1-4)
AAA S 401(3) (Sem: 5-8)

ADDITIONAL COURSES (39 credits)
Select 21 credits with at least 3 credits in AAA S courses
Select 18 credits at the 400-level with at least 9 credits in AAA S courses

AFRICAN STUDIES OPTION: (48 credits)

PRESCRIBED COURSES (9 credits)
AAA S/HIST 191 GH;US;IL(3), AAA S/HIST 192 GH;IL(3) (Sem: 1-4)
AAA S 400(3) (Sem: 5-8)

ADDITIONAL COURSES (39 credits)
Select 21 credits with at least 3 credits in AAA S courses
Select 18 credits at the 400-level with at least 9 credits in AAA S courses
Only 3 credits of AAA S 495 (internship) and 6 credits of AAA S 497, AAA S 495, AAA S 494, or AAA S 499 in any combination may be used to satisfy this requirement.

LAW AND SOCIAL JUSTICE OPTION: (48 credits)

PRESCRIBED COURSES: (18 credits)
AAA S 210 GH;US(3), AF AM 401(3), CRIMJ/CRIM/SOC 012 GS(3), CRIMJ/CRIM 100(3), CRIMJ/CRIM 113(3), CRIMJ/CRIM 451 US(3) (Sem: 1-8)

ADDITIONAL COURSES: (30 credits)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2005
Blue Sheet Item #: 33-01-131
Review Date: 8/31/04
UCA Revision #2: 7/26/07
LA

African Studies

University Park, College of the Liberal Arts (AFRST)
PROFESSOR WILLIAM J. DEWEY, Director

The major in African studies is a multidisciplinary program designed to offer students the opportunity to develop their understanding of various aspects of the African continent, including its socioeconomic conditions and global relations. The program utilizes historical, cultural, geographical, economic, and political approaches to equip students with skills to undertake research on issues pertinent to Africa and to prepare themselves for careers in a range of professions as well for post-graduate studies.

For the B.A. degree in African Studies, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-9 credits of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin)

FIRST-YEAR SEMINAR: (Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES: (Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM: (Included in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 9-18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 45 credits[1]
(This includes 0-9 credits of General Education courses: 3 credits of GA courses; 3 credits of GS courses; and 3 credits of GH courses)

PRESCRIBED COURSES (12 credits)
AFR 105 GN;IL(3), AFR 110 GS;IL(3), AFR 191 GH;IL(3), AFR 192 GH;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (33 credits)
Select 15 credits from the following (100-300 level courses): AFR 150 GH;IL(3), AFR 197(3), AFR 199 IL(3), AFR 202 GS;IL(3), AFR 294(3-6), AFR 297(3-6); AFR 299 IL(3-6), AF AM 302 US(3), AFR 395(3), AFR 399(3), AF AM 100 GS;US(3), AF AM 211 GH;US;IL(3), ART H 335 GA;IL(3), ECON 102 GS(3), ECON 104 GS(3) (Sem: 1-4)


[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
Agribusiness Management

University Park, College of Agricultural Sciences (AG BM)
University Park, The Smeal College of Business
World Campus

PROFESSOR SPIRO STEFANOU, Program Coordinator

Graduates can be found working in the food production, processing, financial services, wholesaling and retailing industries, both in the United States and abroad. A substantial number are employed by agricultural supply firms. Typically, B.S. degree holders begin their careers in sales or as management trainees, and then progress to management as they develop higher levels of expertise and experience. Penn State Agribusiness Management graduates chose careers in many other places. They also are employed in banking and the investment and mutual funds industries, and others have gone to law school, graduate school, or into rural development. The quality and diversity of the program enables Agribusiness majors to undertake a variety of jobs.

This major, which is offered jointly with The Mary Jean and Frank P. Smeal College of Business, includes a core of courses required of all business students. Combining the required specialization area with a minor or electives also allows a student to focus on a particular area of interest.

For the B.S. degree in Agribusiness Management, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 6-9 credits

REQUIREMENTS FOR THE MAJOR: 81-84 credits
(This includes 15 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses; 3 credits of GWS courses.)

PRESCRIBED COURSES (47 credits)
AG BM 102(3)[1], AG BM 106(3)[1], ECON 104 GS(3) (Sem: 1-4)
ACCTG 211(4), AG BM 302(3)[1], AG BM 308W(3)[1], AG BM 320(3)[1], AG BM 338 IL(3), ENGL 202D GWS(3), MIS 204(3),
SCM 200 GQ(4) (Sem: 3-4)
FIN 301(3), SCM 301(3), MKTG 301(3), MGMT 301(3) (Sem: 5-6)

ADDITIONAL COURSES (22-25 credits)
AG BM 101 GS(3)[1] or ECON 102 GS(3)[1] (Sem: 1-4)[77]
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 3-4)
R SOC 011 GS(3) or SOC 001 GS(3) (Sem: 3-6)[78]
AG BM 407(3) or AG BM 408(3) (Sem: 5-8)
Take 3-6 credits in Social, Ethical and Legal Environment of Business from the following: B A 243(4); B LAW 341(3) and B A 342(3); B LAW 243(3) (Sem: 2-6)
Select 6 credits of AG BM 440(3), AG BM 420(3), AG BM 460(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits in a specialty area, in consultation with an adviser (at least 6 of these credits must be at the 300 or 400 level) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[77] AG BM 101 required unless ECON 102 was taken before entering the AG BM major.
[78] R SOC 011 required unless SOC 001 was taken before entering the AG BM major.
Agricultural and Extension Education

University Park, College of Agricultural Sciences (AEE)

PROFESSOR JOHN C. EWING, Program Coordinator

This major helps prepare students for positions in education in agriculture, including schools and colleges, Cooperative Extension, business, trade and professional associations, and government agencies. The Department administers a program approved by the Pennsylvania Department of Education for the preparation of agriculture teachers in public school systems. This includes programs in agricultural production, mechanics, supplies, resources, products, forestry, horticulture, and other agricultural areas.

Students take courses in agricultural and natural resource sciences, leadership and communications, natural science, social science and general education. Students seeking teacher certification schedule professional courses in education and psychology.

Pennsylvania Teacher certification regulations require students to have a GPA of 3.0; satisfactorily complete any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major; and complete an approved Educator Preparation Program. The Educator Preparation Program at Penn State includes documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. At least 40 of these age-appropriate 80 hours must be with learners whose cultural, social, or ethnic backgrounds differ from the candidate's own; completion of an early field experience specified by the certification program; completion of at least 48 semester credit hours, including ENGL 015 or ENGL 030, 3 credits of literature, and 6 credits of quantification and secure occupational experience in the requested area of certification. (See also Teacher Education Programs)

For students seeking teacher certification, the B.S. degree in Agricultural and Extension Education, a minimum of 125-129 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(13-22 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin for additional information)

FIRST-YEAR SEMINAR: (Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES: (Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM: (Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 2-14 credits

REQUIREMENTS FOR THE MAJOR: 76-104 credits
(This includes 13-22 credits of General Education courses; 22 for the teacher certification options--6 credits of GS courses; 9 credits of GN courses; 4 credits of GQ courses; 3 credits of GWS courses; and 13 credits for the non-teacher certification option--6 credits of GS courses; 4 credits of GN courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 19 credits

PRESCRIBED COURSES (19 credits)
AG BM 101 GS(3), BIOL 110 GN(4), ENGL 202C GWS(3) (Sem: 3-4)
AEE 311(3), INTAG 100 GS;IL(3) (Sem: 5-6)
AEE 495(3) (Sem: 7-8)

REQUIREMENTS FOR THE OPTION: 57-85 credits

ENVIRONMENTAL SCIENCE OPTION: (85 credits)

PRESCRIBED COURSES (48 credits)
AGRO 028(3), AN SC 201(4), ASTRO 001 GN(3), CHEM 101 GN(3), CHEM 202(3), PHYS 001 GN(3) (Sem: 1-2)
EDPSY 014(3)[1], EDTHP 115 US(3)[1], WF ED 413(3) (Sem: 2-7)
AEE 100(3), AEE 295(1)[1], SOILS 101 GN(3), STAT 200 GQ(4) (Sem: 3-4)
AEE 313(2)[1], AEE 412(4)[1], AEE 413(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (7 credits)
BIOL 220W GN(4), BIOL 230W GN(4), or BIOL 240W GN(4) (Sem: 2-7)
A S M 101(3) or A S M 217(3) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (30 credits)
Select 3 credits of W courses offered in the College (Sem:1-7)
Select 6 credits in biological, physical ecosystems (Sem: 1-7)
Select 6 credits in environmental impact management (Sem: 1-7)
Select 6 credits in environmental learning (Sem: 1-7)
Select 6 credits in social, political, and legal aspects of environmental science (Sem: 1-7)
Select 3 credits in agricultural systems management (Sem: 3-4)

PRODUCTION OPTION: (80 credits)

PRESCRIBED COURSES (41 credits)
ASTRO 001 GN(3), CHEM 101 GN(3), CHEM 202(3), PHYS 001 GN(3) (Sem: 1-2)
AEE 100(3), AEE 295(1)[1], STAT 200 GQ(4) (Sem: 3-4)
EDPSY 014(3)[1], EDTHP 115 US(3)[1], SOILS 101 GN(3), WF ED 413(3) (Sem: 2-7)
AEE 313(2)[1], AEE 412(4)[1], AEE 413(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (4 credits)
BIOL 220W GN(4), BIOL 230W GN(4), or BIOL 240W GN(4) (Sem: 2-7)

SUPPORTING COURSES AND RELATED AREAS (35 credits)
Select 3 credits of W courses offered in the College (Sem: 1-7)
Select 14 credits in agriculture (Sem: 1-7)
Select 6 credits in animal science (Sem: 1-7)
Select 6 credits in plant/soil science (Sem: 1-7)
Select 6 credits in agricultural systems management (Sem: 3-6)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-05-002
Review Date: 02/24/2015
R & T: 01/14/2014
UCA Revision #1: 8/2/06
AG

Agricultural Science

University Park, College of Agricultural Sciences (AG SC)

PROFESSOR JOHN C. EWING, Program Coordinator

This major enables students to develop programs of study to serve their individual needs by assembling courses selected from various departments within the College of Agricultural Sciences. The student develops either a broad background in agriculture or a special program of study not currently offered within departments of the college. Students are expected to focus study on one or more disciplines of the agricultural sciences by selecting a minor from the approved list of minors offered by the College of Agricultural Sciences. The student, in consultation with an adviser, is given considerable flexibility for selecting courses to satisfy individual interests and aspirations.

Students can prepare themselves for careers in agricultural and natural resource related sales, and/or public relations; food, agricultural and natural resource commodity groups, agricultural finance; governmental and conservation agencies; the Cooperative Extension Service; land use and appraisal; and international agriculture agencies.

For the B.S. degree in Agricultural Science, a minimum of 123 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18-30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 6-26 credits

REQUIREMENTS FOR THE MAJOR: 82-90 credits
(This includes 18-30 credits of General Education courses; 0-3 credits of GA courses; 0-3 credits of GHA courses; 9 credits of GN courses; 0-6 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (12 credits)
CAS 100 GWS(3), ENGL 015 GWS(3) (Sem: 1-2)
AEE 360(3), AEE 460(3) (Sem: 5-8)

ADDITIONAL COURSES (43-48 credits)
BIOL 011 GN(3) and BIOL 012 GN(1), or BIOL 110 GN(4) or BI SC 003 GN(3) (Sem: 1-2)
CHEM 101 GN(3) or CHEM 110 GN(3) (Sem: 1-4)
Select 3 credits from ENGL 202C GWS(3), ENGL 202D GWS(3) (Sem: 3-4)
Select 3 credits from AEE 330W(3), AEE 440(3) (Sem: 4-7)
Select 3-4 credits in Crop Management: Any AGECO except X95 and X96, Any AGRO except X95, X96, Any ENT except X95, X96 (Sem: 5-6)
Select 3 credits in any HORT except X95, X96 (Sem: 5-6)
Select 3 credits in Agricultural Economics and Rural Sociology: Any AG BM except X95 and X96, Any CED except X95, X96, Any R SOC (Sem: 5-6)
Select 3 credits in International Agriculture: AEE 400(3), CED 450 IL(3), INTAG 100 GS:IL(3), INTAG 481(3), R SOC 420 US:IL(3), Any College of Agricultural Sciences international course (Sem: 5-6)
Take 1-2 credits in Careers in Agriculture: AEE 100(2), AG 100(1), AG 113(1), AN SC 290W(1), E R M 151(1) (Sem: 5-6)
Select 3-4 credits in any AN SC except 291, X95, X96 (Sem: 5-6)
Select 3 credits in Technology in Agriculture: A S M 217(3), AGECO 144 GN(3), AGECO 457(3); AN SC 207(2) and AN SC 208(1); E R M 210 GN(3), FD SC 200(3) (Sem: 5-6)
Select 6 credits in Natural Resources/Ecology: from AGECO 122 GN(3), AGECO 201(3), E GEE 101 GN(3), FOR 470(3), R SOC 327(3), SOILS 071 GN(IL(3), SOILS 101 GN(3), SOILS 412W(3), W F S 209 GN(3) (Sem: 5-6)
Select 3 credits from AEE 311(3) or AEE 465(3) (Sem: 5-8)
Select 3 credits in Agricultural and Environmental Policy; AG 160 GH(3), AGECO 134 GN(3), CED 201(3), FD SC 105 GHA(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (27-30 credits)
Select 9 credits in Agriculture (Sem: 5-8)
Select 18-21 credits for College of Agricultural Sciences Minor [1] (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2011
Blue Sheet Item #: 39-06-002
Review Date: 04/12/2011
UCA Revision #: 8/2/06

AG

Animal Science

University Park, College of Agricultural Sciences (AN SC)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

DR. ROBERT MIKESSELL, Program Coordinator

Animal Science may be defined as the study and integration of all disciplines that relate to the function and care of animals for the benefit of society by providing companionship, food, fiber, performance, and research. The Animal Science major includes references to all types of animals.

The educational experiences included in this major should prepare the student for a wide range of entry-level positions in production agriculture agribusiness, and related industries, and provide preparation for the pursuit of post-baccalaureate studies leading to professional or advanced degrees. The student is expected to develop a comprehensive understanding of the biological and physical sciences underlying the functioning of all types of animals.

Realizing the wide range of career possibilities requiring diverse types of academic preparation, two options of study are available: the Business/Management Option and the Science Option.

For the B. S. degree in Animal Science, a minimum of 124 credits is required.

BUSINESS/MANAGEMENT OPTION: The primary objective of this option is to prepare the student for entry-level positions in agribusiness organizations and in the animal and food industries. The student may develop a program with specie specialization or diversity. The student may develop a foundation in accounting, economics, finance, marketing, and other business-related areas. Graduates seek entry-level employment opportunities as loan officers with financial institutions; technical service and sales representatives for pharmaceutical, agri-chemical, feed or food producing companies; field representatives for breed organizations or producer cooperatives; public relations and human resources personnel for agribusiness companies; management trainees for numerous agribusiness firms; management trainees or assistant managers of animal production units, and roles in government agencies.

SCIENCE OPTION: The primary objective of this option is to prepare the student for entry into post-baccalaureate study programs in animal and related biological sciences. Graduates who have obtained the proper qualifications may pursue advanced studies in a wide variety of disciplines, including animal science, biotechnology, genetics, microbiology, nutrition, physiology, molecular biology, pharmaceutical research, and veterinary medicine. Graduates not desiring to pursue advanced studies seek entry-level employment opportunities as research technicians, technical service representatives for various industrial companies, food inspectors, laboratory animal caretakers, and public relations personnel.

TO VIEW THE Animal Science Minor (AN SC)

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18-24 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-13 credits

REQUIREMENTS FOR THE MAJOR: 90-100 credits
(This includes 18-24 credits of General Education courses: 0-3 credits of GA courses; 9 credits of GN courses; 3-6 credits of GS courses; 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 42-47 credits
(Courses taken as common requirements cannot be used to meet requirements within the option)

PRESCRIBED COURSES (24 credits)
AN SC 100 GN(3) (Sem: 1-2)
BIOL 110 GN(4) (Sem: 1-4)
AN SC 201(4)\[1\], AN SC 207(2)\[1\], AN SC 208(1)\[1\], AN SC 290W(1), AN SC 300 GN(3)\[1\] (Sem: 3-4)
AN SC 301(3)\[1\], B M B 211(3) (Sem: 3-6)

ADDITIONAL COURSES (15-18 credits)
AG BM 101 GS(3) or ECON 102 GS(3) (Sem: 1-2)
Select 6-8 credits from:
-- select 3-4 from MATH 021 GQ(3), MATH 022 GQ(3), MATH 110 GQ(4), or MATH 140 GQ(4) (Sem: 1-2)
-- select 2-4 from CMPSC 101 GQ(3), CMPSC 203 GQ(4), MATH 022 GQ(3), MATH 111 GQ(2), MATH 141 GQ(4), STAT 100 GQ(3), STAT 200 GQ(4), or STAT 250 GQ(3) (Sem: 1-2)
CHEM 202(3) or CHEM 210(3)
Select 3-4 credits \[1\] from AN SC 305(3), AN SC 306(3), AN SC 308(4), AN SC 309(4), AN SC 310(3), AN SC 311(4), AN SC 315(3), AN SC 324(3), or AN SC 327(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (3-5 credits)
Select 3-5 credits in communication skills courses from department list. Certain courses may double count as general education courses; consult with your adviser. (Sem: 7-8)

REQUIREMENTS FOR THE OPTION: 48-53 credits

BUSINESS/MANAGEMENT OPTION: (49-52 credits)

PRESCRIBED COURSES (7 credits)
ACCTG 211(4) (Sem: 3-4)
AN SC 322(3) (Sem: 5-6)

ADDITIONAL COURSES (19-22 credits)
CHEM 101 GN(3) or CHEM 110 GN(3) (Sem: 1-2)
AG BM 102(3) or MKTG 221(3) (Sem: 3-4)
AG BM 200(3) or MGMT 100(3) (Sem: 3-4)
MICRB 106 GN(3) and MICRB 107 GN(1); or MICRB 201(3) and MICRB 202(2) (Sem: 5-6)
Select 3-4 credits from AN SC 305(3), AN SC 306(3), AN SC 308(4), AN SC 309(4), AN SC 310(3), AN SC 311(4), AN SC 315(3), AN SC 324(3), AN SC 327(3), AN SC 405(3), AN SC 407(3), or AN SC 410(4)(Sem: 5-8)
Select 3-4 credits from AN SC 420(4), AN SC 423(3), AN SC 427(3), or AN SC 431W(4) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (23 credits)
Select 23 credits (at least 9 credits of business and 9 credits of production courses; 12 credits must be 400-level courses) from department list (Sem: 5-8)
(Students may apply 6 credits of ROTC.)

SCIENCE OPTION: (48-53 credits)

PRESCRIBED COURSES (27 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1) (Sem: 1-2)
B M B 212(1), B M B 221(2) (Sem: 5-6)
MICRB 201(3), MICRB 202(2), PHYS 250 GN(4) (Sem: 5-6)
AN SC 423(3), AN SC 431W(4) (Sem: 7-8)

ADDITIONAL COURSES (16-19 credits)
CHEM 203(3) or CHEM 212(3) and CHEM 213(2) (Sem: 3-4)
Select 4 credits from BIOL 220 W GN(4), BIOL 230 W GN(4), or BIOL 240 W GN(4) (Sem: 3-4)
Select 3 credits from AGRO 028(3), AN SC 211(3), AN SC 213(3), or SOILS 101 GN(3) (Sem: 5-6)
Select 3 credits from AN SC 322(3), BIOL 133 GN(3), or BIOL 222(3) (Sem: 5-6)
Select 3-4 credits from AN SC 420(4), AN SC 423(3), AN SC 427(3), or AN SC 431W(4) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (5-7 credits)
Select 5-7 credits of 400-level courses from department list (Students may apply 6 credits of ROTC.) (Sem: 7-8)

Integrated B.S. in Animal Science and Master of Biotechnology in Biotechnology

Qualiﬁed students should formally apply to the Master of Biotechnology degree when they have earned a minimum of 75 credits in their B.S. curriculum. To make sure students ﬁnish within the shortest time-to-degree, students intending to apply to the integrated program will be closely mentored by their respective undergraduate program coordinators to guide their progress through their B.S. curriculum. The undergraduate program coordinators will be directly consulted by the Director of the Master of Biotechnology in Biotechnology program regarding admission of a student applicant to the Master of Biotechnology in Biotechnology program.

Students admitted to the integrated program will follow their undergraduate curriculum until the beginning of their fourth year, at which time, they start taking courses required for the Master of Biotechnology degree. In the summer following the Spring semester of their fourth year, students will participate in off-campus internships and have the option of either continuing at their off-campus location for their research project in the following Fall semester, or coming back to campus to do a research project. The final Spring semester will be devoted to completing the course and credit requirements for the Master of Biotechnology degree. As designed, students can opt to graduate with a B.S. degree at the end of the Spring semester of their 4th year, when they should have completed the credit requirements of the B.S. degree program (124 credits). The following table outlines the program of study for students in this program:
<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>B.S. Animal Science (124 credits required) credits completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Fall</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>16</td>
</tr>
<tr>
<td>II</td>
<td>Fall</td>
<td>15.5</td>
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<td></td>
<td>Spring</td>
<td>16</td>
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<tr>
<td>III</td>
<td>Fall</td>
<td>15.5</td>
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<tr>
<td></td>
<td>Spring</td>
<td>16</td>
</tr>
<tr>
<td>IV</td>
<td>Fall</td>
<td>15*</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>16*</td>
</tr>
</tbody>
</table>

**Total credits for B.S.** 124

* The following courses to be taken in these semesters will be cross-counted towards the B.S. and Master of Biotechnology degrees:
  - BIOTC 479. Methods in Biofermentation OR CH E 409 (3 credits)
  - BM B 400. Molecular Biology of the Gene (2-3 credits)
  - IBIOS 571. Current Issues in Biotechnology (2 credits)
  - IBIOS 591. Ethics in the Life Sciences (1 credit)
  - IBIOS 593. Molecular Biology Laboratory (3 credits)

**Total credits cross-counted in B.S. and Master of Biotechnology degrees** 12 credits, 6 of which are 500-level credits

Master of Biotechnology in Biotechnology (30 credits required, 18 of which must be 500-level)

<table>
<thead>
<tr>
<th>IV</th>
<th>Summer</th>
<th>IBIOS 595 or equivalent in AN SC (2 credits) Internship</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>Fall</td>
<td>IBIOS 594. Research Project (3-6 credits)</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>IBIOS 590. Colloquium (1 credit) Electives, 500-level (3-6 credits) Other graduate level electives (6 credits)</td>
</tr>
</tbody>
</table>

**Minimum total credits earned for Summer and 5th year** 18 credits, at least 12 of which are 500-level credits

**Admission Requirements**

Students must have a GPA of 3.5 at the time of application to the integrated degree program when they have completed at least 75 credits of their B.S. curriculum. The GRE scores normally required in the Master of Biotechnology in Biotechnology program will be waived for applicants to the integrated B.S.-Master of Biotechnology degree.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013 (ANSCI); Summer Session 2006 (Integrated B.S./Master of Biotechnology in Biotechnology-Grad. Degree Name Change)

Blue Sheet Item #: 41-04-001 (AN SC); 34-06-001 (Integrated B.S./Master of Biotechnology in Biotechnology)

Last Revised by the Department: Fall Semester 2012

Review Date: 01/15/2013

**AG**

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**Anthropology**

*University Park, College of the Liberal Arts (ANTH)*

PROFESSOR GEORGE R. MILNER, Head, Department of Anthropology

Anthropology is a holistic scientific discipline having links to the humanities. Anthropologists document, describe, and
explain the physical and cultural differences of societies, both past and present. Anthropology sees the individual as part of a larger social order that both impinges upon and is molded by those who belong to it. Anthropology investigates how cultures interact and relate within specific economic, political, and ecological frameworks over time.

The Bachelor of Arts major focuses on the biological and cultural variations of human populations through archaeology, biological anthropology, and cultural anthropology. In addition to class work, students receive practical training in laboratory and field work.

For the B.A. degree in Anthropology, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR.)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 12 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 43 credits
(This includes 4 credits of General Education GQ courses.)

PRESENTED COURSES (13 credits)
ANTH 002 GS(3), ANTH 021 GN(3), ANTH 045 GS;US;IL(3) , STAT 200 GQ(4) (Sem: 1-6)

ADDITIONAL COURSES (30 credits)
Select 15 credits in ANTH courses other than ANTH 001 GS;US;IL(3) (no more than 6 credits from 190-199, 290-299, 390-399, and 490-499, other than 297 and 497) (Sem: 1-8)
Select 15 credits from the following ranges (at least 3 credits must be in each range):
a. Archaeology: ANTH 420-439 (Sem: 3-6)
b. Biological anthropology: ANTH 400-419, ANTH 460-473 (Sem: 3-6)
c. Cultural anthropology: ANTH 440-459, ANTH 474-479 (Sem: 3-6)

Integrated B.A./M.A in Anthropology Degree Requirements

The Department of Anthropology offers an integrated B.A./B.S./M.A. (IUG) program designed to allow academically superior students to obtain a B.A. or B.S. degree in Anthropology, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), and a M.A. degree in Anthropology in five years of study. To complete the program in five years, students interested in the Integrated Undergraduate and Graduate degree in Anthropology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow course scheduling for the B.A. degree in CAMS and either the B.A. degree in Anthropology or the B.S. degree in Archaeological Science (see the Undergraduate Bulletin). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.A. advisors will be appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected options for their B.A. or B.S. majors, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

Admission Requirements

Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their junior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

Graduate Coursework

REQUIRED COURSES

ANTHROPOLOGY (ANTH)
493. Field Techniques (3)
521. Current Literature in Archaeology (2)
Archaeological Science

University Park, College of the Liberal Arts (ARSCI)

PROFESSOR GEORGE R. MILNER, Head, Department of Anthropology
(The Bachelor of Science degree in Archaeological Science is offered by the Archaeology Program in the Department of Anthropology.)

This degree provides the opportunity to develop a strong foundation in research methods, quantification, field methods, and laboratory science. It prepares students with the skills and competencies needed to pursue careers in cultural resource management. Students contemplating futures in nonacademic archaeology should consider this degree or some of its recommended courses.

For the B.S. degree in Archaeological Science, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

GENERAL EDUCATION: 45 credits
(10 of these 45 credits are included in REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 5 credits

REQUIREMENTS FOR THE MAJOR: 70 credits[1]
(This includes 10 credits of General Education courses: 4 credits of GQ courses; 6 credits of GN courses.)

PRESCRIBED COURSES (40 credits)
ANTH 002 GS(3), ANTH 011 GS;IL(3), ANTH 021 GN(3), ANTH 045 GS;US;IL(3), ANTH 421(3), ANTH 423(3), ANTH 428(3), ANTH 433(3), 3 credits from ANTH 492(3-6), 3 credits from ANTH 493(3-6), GEOSC 001(3), SOILS 101 GN(3), STAT 200 GQ(4) (Sem: 1-6)

ADDITIONAL COURSES (30 credits)
Select 9 additional Archaeology credits from the following ranges: ANTH 320-339 or ANTH 420-439 (Sem: 3-8)
Select an additional 18 credits in ANTH electives (other than ANTH 001, no more than 9 credits from 190-199, 290-299, 390-399, 490-499, other than 297 and 497) (Sem: 3-8)
Select 3 credits from GEOSC 320(3), or SOILS 416(4) (Sem: 6-8)

Integrated B.S. in Archaeological Science and B.A. in Classics and Ancient Mediterranean Studies/M.A. in Anthropology Degree Requirements

The Department of Anthropology offers an integrated B.A./B.S./M.A. (IUG) program designed to allow academically superior students to obtain a B.A. or B.S. degree in Anthropology, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), a B.S. degree in Archaeological Science and a M.A. degree in Anthropology in five years of study. To complete the program in five years, students interested in the Integrated Undergraduate and Graduate degree in Anthropology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow course scheduling for the B.A. degree in CAMS and either the B.A. degree in Anthropology or the B.S. degree in Archaeological Science (see the Undergraduate Bulletin). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.A. advisors will be appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected options.
for their B.A. or B.S. majors, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

Admission Requirements

Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their junior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

Graduate Coursework

REQUIRED COURSES

ANTHROPOLOGY (ANTH)
493. Field Techniques (3)
521. Current Literature in Archaeology (2)
545. Seminar in Anthropology (6)
588. Method and Theory in Archaeology (3)
600. Thesis Research (6)

ADDITIONAL COURSES

Four required credits in ANTH 494(1-12) or CAMS 494(1-12)
Six required credits in CAMS 592(3), 593(3-6), or 596(1-9)

NOTE: Internships will be counted as elective credits.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015
UCA Revision #1: 8/2/06
Dept head updated by Publications: 10/19/11
LA

Architectural Engineering

University Park, College of Engineering (A E)

PROFESSOR CHIMAY J. ANUMBA, Head, Department of Architectural Engineering

This major emphasizes the application of scientific and engineering principles to the planning, design, and construction of buildings and building systems. The goal of the program is to provide engineering graduates with the best education available for careers in the building professions. Graduates will have the ability to practice as registered professional engineers in a variety of areas, both public and private, related to the planning, design, construction, and operation of buildings and to assume a place of leadership in society.

Four options are available in the ten-semester major: the Construction option, which emphasizes building construction engineering and construction management; the Lighting/Electrical option, which emphasizes the design of lighting and electrical systems for buildings; the Mechanical option, which emphasizes the design of heating, ventilating and air-conditioning systems in buildings; and the Structural option, which emphasizes the analysis and design of building structural systems. Courses in architectural design are included in all options to give the engineering student an understanding of architectural design and its relation to engineering. Courses in engineering design are provided throughout the program. The design experience is culminated in a year-long capstone design course.

A limited number of undergraduate students in the B.A.E. program will be considered for admission to one of two integrated undergraduate-graduate degree programs. The first leads to the student earning both the B.A.E. and M.A.E. degrees and involves a research-oriented thesis in addition to the capstone undergraduate senior project. Students who are currently enrolled in the 7th semester of the B.A.E. degree program may apply to one of the two integrated programs and will be admitted following a positive review by the faculty committee on graduate admissions. To be considered for admission to either program, students must have attained a GPA of at least 3.0 and a grade of C or better in all classes listed as AE. A commitment from an AE graduate faculty member to serve as the student's M.S. thesis adviser is necessary for admission to the B.A.E./M.S. program. Students admitted to an integrated program must maintain a GPA in all classes used toward the M.A.E. or M.S. degree of at least 3.0. Students must complete a minimum of 172 credits for both the integrated B.A.E./M.A.E. and B.A.E./M.S. degree programs, 18 of which must be at the graduate level (500, 600 or 800-level). For the B.A.E./M.A.E. degree program, all of graduate credits are course credits. For the B.A.E./M.S. degree program, a thesis is required and six credits of thesis research (600 or 610) must be included in the candidate's academic course plan.

The professional degree, Bachelor of Architectural Engineering, is granted upon the satisfactory completion of the five-year program.
Program Educational Objectives:  
The undergraduate program in Architectural Engineering is designed to produce graduates who will be:

Engaged in a professional career in the building industry.
Qualified and competent to sit for the professional engineering exam.
Capable of meeting the challenges of the engineering work environment and assuming leadership responsibilities.
Capable of solving design and project related problems based on sound engineering principles as demanded by their work.
Successful in conducting multi-disciplinary/inter-disciplinary interactions as required by their work.
Engaged in service activities in the public and professional realms.

Program Outcomes (Student Outcomes):  
The expected educational outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
(l) a proficiency in mathematics through differential equations, probability and statistics, calculus based physics, and general chemistry
(m) proficiency in statics, strength of materials, thermodynamics, fluid mechanics, electric circuits, and engineering economics
(n) proficiency in a minimum of three (3) of the four (4) basic curriculum areas of structures, building mechanical and electrical systems, and construction/construction management
(o) Engineering design capabilities in at least two (2) of the three (3) basic curriculum areas of architectural engineering, and that design has been integrated across the breadth of the program
(p) An understanding of architectural design and history leading to architectural design that will permit communication, and interaction, with other design professionals in the execution of building projects

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHSY 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.A.E. degree in Architectural Engineering, a minimum of 160 credits is required. This baccalaureate program in Architectural Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., [www.abet.org](http://www.abet.org).

For the integrated B.A.E./M.A.E. degrees, a minimum of 172 credits of course work is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(33 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 148 credits
(This includes 33 credits of General Education courses: 9 credits of GN courses; 6 credits of GA courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 112 credits

PRESCRIBED COURSES (102 credits)  
CHEM 110 GN(3)\textsuperscript{[11], CHEM 111 GN(1), E G 130(3), MATH 140 GQ(4)\textsuperscript{[11], MATH 141 GQ(4)\textsuperscript{[11], PHYS 211 GN(4)\textsuperscript{[11]} (Sem: 1-2)
A E 202(3), A E 221(3), A E 222(3), ARCH 130A(6), E MCH 211(3), E MCH 213(3), MATH 250(3)[11], PHYS 212 GN(4)[11], PHYS 213 GN(2) (Sem: 3-4)
A E 308(4)[1], A E 309(3), A E 310(3)[11], A E 311(3)[11], A E 372(3)[1], A E 481W(4), A E 482(4), ARCH 210 GA(3), ARCH 211 GA(3), E MCH 212(3), M E 201(3), MATH 220 GQ(2-3), MATH 231(2), STAT 401(3) (Sem: 5-6)
ARCH 441(3), ARCH 443(1) (Sem: 7-8)
ENGL 202C GWS(3) (Sem: 9-10)

ADDITIONAL COURSES (10 credits)
Select A E 124S(1) or 1 credit of another First-Year Seminar (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), or ECON 014 GS(3) (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)

REQUIREMENTS FOR THE OPTION: 36 credits

CONSTRUCTION OPTION: (36 credits)

PRESCRIBED COURSES (24 credits)
A E 472(3), A E 473(3), C E 209(2) (Sem: 9-10)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits from technical courses on department list (Sem: 7-8)
Select 5 credits from technical courses on department list[19] (Sem: 9-10)
Select 4 credits of geotechnical courses (Sem: 9-10)

LIGHTING/ELECTRICAL OPTION: (36 credits)

PRESCRIBED COURSES (24 credits)
A E 404(3), A E 454(3), A E 461(3), A E 467(3), ARCH 442(3)[19] (Sem: 7-8)
A E 444(3), A E 464(3), A E 466(3) (Sem: 9-10)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits from technical courses on department option list (Sem: 7-8)
Select 9 credits from technical courses on department option list[19] (Sem: 9-10)

MECHANICAL OPTION: (36 credits)

PRESCRIBED COURSES (27 credits)
A E 404(3), A E 454(3), A E 455(3), A E 457(3), A E 467(3) ARCH 442(3)[19], M E 320(3), M E 410(3) (Sem: 7-8)
A E 458(3) (Sem: 9-10)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits from technical courses on department option list[19] (Sem: 7-8)
Select 6 credits from technical courses on department option list (Sem: 9-10)

STRUCTURAL OPTION: (36 credits)

PRESCRIBED COURSES (23 credits)
A E 401(3), A E 402(3), A E 403(3), A E 430(3), ARCH 442(3)[19], E MCH 315(2), E MCH 316(1) (Sem: 7-8)
A E 431(3), C E 209(2) (Sem: 9-10)

SUPPORTING COURSES AND RELATED AREAS (13 credits)
Select 9 credits from technical courses on department list[19] (Sem: 7-8)
Select 4 credits in Geotechnical (Sem: 7-8)

Note: The following substitutions are allowed for students attending campuses where the indicated course is not offered: ED&G 100(3) can be substituted for E G 130(3).

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[19] Students having successfully completed ROTC upon graduation, may apply 3 credits of ROTC to these courses. Additionally, 3 credits of ROTC may be applied to GHA.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-032
Review Date: 02/21/2012
R & T: Approved 5/24/2013
UCA Revision #1: 8/2/06
UCA Revision #2: 7/26/07
EN

Architecture

University Park, College of Arts and Architecture (ARCBS and BARCH)

PROFESSOR MEHRDAD HADIGHI, Head, Department of Architecture

The Department of Architecture is a member of the Association of Collegiate Schools of Architecture and the Bachelor of Architecture degree is accredited by the National Architectural Accrediting Board. The major provides for the education of architects at the professional and pre-professional levels.
"In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree."

The Pennsylvania State University, Department of Architecture offers the following NAAB-accredited degree program:

**B.Arch. (162 undergraduate credits)**

Next accreditation visit for the B.Arch. accredited degree program: 2022 (anticipated)

(Excerpt from NAAB Conditions for Accreditation, 2009 Edition)

**Bachelor of Architecture**

The professional program (BARCH) is a five-year curriculum leading to the Bachelor of Architecture degree requiring 162 credits. It prepares those who seek careers as practicing architects. It also provides professional preparation for those who wish to enter related design fields. Graduates of the Bachelor of Architecture program are eligible, after appropriate internship experience, to sit for the Architect Registration Examination. Successful completion of all parts of the Architect Registration Examination is required for registration as an architect. The Bachelor of Architecture curriculum includes coursework in architectural design, history, theory, structural systems, building materials, environmental control systems, visual communications, professional practice, and systems integration. Supporting courses provide students with the flexibility to explore a range of interests, develop concentrations, or pursue minors. A required semester abroad in Rome, Italy, is also a component of this program. All students admitted to the University in the Department of Architecture are enrolled in the five-year professional program leading to the Bachelor of Architecture degree.

Students may elect to leave Penn State after completing the requirements of the four-year (ARCBS) program and receive the Bachelor of Science degree.

**Bachelor of Science**

The pre-professional Bachelor of Science degree program in Architecture (ARCBS) is a four-year curriculum which requires a minimum of 135 credits. The curriculum mirrors the first four years of the professional (BARCH) program. The ARCBS program prepares graduates to pursue careers in fields such as construction, real estate development, public administration, or historic preservation. Students may also continue their education at the graduate level in fields such as architecture, urban planning, or law. Enrollment in the pre-professional (ARCBS) program is limited to those students who transfer from the professional (BARCH) program.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**Bachelor of Architecture**

**GENERAL EDUCATION:** 45 credits

(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**REQUIREMENTS FOR THE MAJOR:** 123 credits[1]

(This includes 6 credits of General Education GA courses.)

**PRESCRIBED COURSES** (99 credits)

A E 210(3), ARCH 121(2), ARCH 122(2), ARCH 131S(4), ARCH 132(4), ART H 201 GA;IL(3), ART H 202 GA;US;IL(3) (Sem: 1-2)
A E 421(3), A E 422(3), ARCH 203(3), ARCH 204(3), ARCH 210(3), ARCH 231(6), ARCH 232(6) (Sem: 3-4)
A E 211(3), A E 424(3), ARCH 311W(3), ARCH 331(6), ARCH 332(6) (Sem: 5-6)
ARCH 431(6), ARCH 480(3), ARCH 499A(6), ARCH 499B IL(3), ARCH 499C IL(3) (Sem: 7-8)
ARCH 451(3), ARCH 491(6 per semester, maximum of 12) (Sem: 9-10)

**ADDITIONAL COURSES** (6 credits)

Select 6 credits from: ARCH 491(6, maximum 12), ARCH 492H(6), or ARCH 499F(6) (Sem: 9-10)

**SUPPORTING COURSES AND RELATED AREAS** (18 credits)

Select 3 credits in non-Western traditions in architecture from approved department list (Sem: 1-8)
Select 15 credits in consultation with an academic adviser. This category of course work gives students the freedom to explore a range of academic interests, develop concentrations, or pursue minors (Sem: 3-10)

**Bachelor of Science**

**GENERAL EDUCATION:** 45 credits

(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in REQUIREMENTS FOR THE MAJOR)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 96 credits[1]
(This includes 6 credits of General Education GA courses.)

PRESCRIBED COURSES (87 credits)
A E 210(3), ARCH 121(2), ARCH 122(2), ARCH 131S(4), ARCH 132(4), ART H 201 GA;IL(3), ART H 202 GA;US;IL(3) (Sem: 1-2)
A E 421(3), A E 422(3), ARCH 203(3), ARCH 204(3), ARCH 210(3), ARCH 231(6), ARCH 232(6) (Sem: 3-4)
A E 211(3), A E 424(3), ARCH 311W(3), ARCH 331(6), ARCH 332(6) (Sem: 5-6)
ARCH 431(6), ARCH 499A(6), ARCH 499B IL(3), ARCH 499C IL(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits in non-Western traditions in architecture from approved department list (Sem: 1-8)
Select 6 credits in consultation with an academic adviser (Sem: 3-8)

Integrated B.ARCH./M.S. in Architecture Program

The Department of Architecture offers a limited number of academically superior students enrolled in the fourth year of the Bachelor of Architecture degree program the opportunity to enroll in an integrated program leading to both the B.Arch. and the M.S. in Architecture degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially, and to earn the two degrees in a shorter period of time. In particular, the program encourages the student to integrate the undergraduate thesis design project with the master's thesis, thereby achieving a greater depth of inquiry. The number of openings to this special program is limited; admission is by invitation of the faculty and is extremely selective.

Admission Requirements

Applicants to the integrated program must be enrolled in the fourth year of a B.Arch. program or otherwise qualified to apply for admission to the fifth year of the B.Arch. program at Penn State. To be admitted, applicants must have a minimum 3.20 junior/senior overall grade-point average (on a 4.0 scale) as well as: (1) a minimum 3.20 GPA in architectural design courses (studio), and (2) a minimum 3.20 GPA in all course work except architectural design courses (studio).

All applicants for admission to the Integrated B.Arch./M.S. in Architecture degree program must submit the following:

· a completed Graduate School application, found online at [http://www.gradsch.psu.edu/portal/](http://www.gradsch.psu.edu/portal/), and payment of the application fee.

· names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.

· a statement of intent/plan of study, which should be primarily a description of the applicant's professional goals. The statement/plan shall clearly describe the student's proposed general thesis topic and a strategy for pursuing it, including a list of proposed courses and a list of faculty whom the student foresees as contributing to the course of study.

· a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required.

The best-qualified students will be accepted up to the number of spaces available for new students. Acceptance to the program prior to the completion of all required course work is provisional, contingent upon meeting the previous requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06-011

Review Date: 04/08/2014

AA

Art

*University Park, College of Arts and Architecture (ARBFA)*

PROFESSOR GRAEME SULLIVAN, Director, School of Visual Arts

The Bachelor of Fine Arts degree requires thorough preparation and is intended to develop a level of competence that will enable persons who wish to pursue professional careers in art to prepare themselves for specialized graduate studies, specialized professional training, and/or immediate participation in creative work.

Students enrolled in the School of Visual Arts may seek entrance into the B.F.A. program no earlier than the second semester and no later than the fourth semester.
There will be a continuous review of portfolio and performance of students enrolled in the B.F.A. program throughout
the entire program. Students who do not meet the standards or who do not want to continue in the B.F.A. program may
return to the B.A. program in art or choose another program of study.

For the B.F.A. degree in Art, a minimum of 123 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(6 of these credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 84 credits
(This includes 6 credits of General Education GA courses.)

PRESCRIBED COURSES (16 credits) [1]
ART 011S(1), ART 110S(3), ART 111 (3) (Sem: 1-2)
ART 122Y US(3), ART H 111 GA;IL(3), ART H 112 GA;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (15 credits) [1]
Select 15 credits at the beginning level from ART 201(3), ART 203(3), ART 211 US(3), ART 217(3), ART 220(3), ART
223(3), ART 230(3), ART 240(3), ART 250(3), ART 280(3), ART 296(3), ART 297(3), ART 299(3), PHOTO 100 GA(3), or
PHOTO 201(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (53 credits)
Select 47 credits in Art at the 300 or 400 level, 24 of which must be in an area of concentration from the following:
ceramics, drawing and painting, new media, photography, printmaking, or sculpture [1] (Sem: 3-8)
Select 6 credits in art history (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-029

Review Date: 8/15/2015

AA

Art

Abington College (ARTAB)
University Park, College of Arts and Architecture (ARTBA)

PROFESSOR GRAEME SULLIVAN, Director, School of Visual Arts

The B.A. degree in art provides a comprehensive liberal education coupled with professional resident instruction in art.
Depending on each student's objectives and course choices, this degree provides preparation for a professional career,
a foundation for graduate studies, or a liberal arts education in art. Each student must elect an area of concentration
from one of the following: ceramics, drawing and painting, new media, photography, printmaking, or sculpture.

For a B.A. degree in Art, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR. See description of General Education in this
bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 5 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12
credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 52 credits
(This includes 6 credits of General Education GA courses.)
PRESCRIBED COURSES (16 credits)[1]
ART 011S(1), ART 110S(3), ART 111(3) (Sem: 1-2)
ART 122Y US(3) (Sem: 1-4)
ART H 111 GA;IL(3), ART H 112 GA;IL(3) (these credits may also be counted toward the General Education Arts requirement) (Sem: 1-4)

ADDITIONAL COURSES (15 credits)[1]

SUPPORTING COURSES AND RELATED AREAS (21 credits)
(Include at least 15 credits at the 300 or 400 level.)
Select 15 credits from one of the following areas of concentration: ceramics, drawing and painting, new media, photography, printmaking, and sculpture[1] (Sem: 3-8)
Select 6 credits in art history (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-028
Review Date: 09/15/2015
AA

Art Education

University Park, College of Arts and Architecture (A ED)

PROFESSOR GRAEME SULLIVAN, Director, School of Visual Arts

The purpose of the Art Education program is to prepare knowledgeable, skilled, and caring professional educators to become critical, reflective practitioners, researchers and artists, and agents of change for social justice in diverse contexts of educational practice; generate and disseminate knowledge that leads to new pedagogical understandings on which more effective policies and practices can be grounded; and collaborate across disciplines, professions, and constituencies to promote social change that leads to educational improvement and transformation. An integral part of the program involves a variety of observational and participatory experiences in art learning environments, and an extensive pre-practice internship. Upon completion of the degree, employment prospects and/or acceptance for advanced graduate studies depends upon individual achievement and qualifications. (See also Teacher Education Programs.)

All candidates seeking entrance to Art Education for Schools option must meet the following entrance to major criteria:

1. Minimum 3.00 cumulative GPA and at least 48 credits completed (at the time of application).
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.
3. Complete 6 credits in Quantification (GQ)
4. Complete ENGL 015 or 030
5. Complete 3 credits in literature (GH) (C or higher required)
6. Complete early field experience: A ED 101S (C or higher required)
7. Complete education foundation courses: EDPSY 014, PSYCH 100 (C or higher required)
8. Complete art education foundation courses: A ED 201W, 211, 212 (C or higher required)
9. Complete art studio & art history foundations: ART 110S, 111, 122Y, ART H 111, 112 (C or higher required)
10. Complete and document a minimum of 80 hours of paid or volunteer work with age appropriate population. At least 40 of these age-appropriate 80 hours would be satisfied by working with "under-represented" learners whose cultural, social, or ethnic backgrounds differ from the candidate's own.

For the B.S. degree in Art Education a minimum of 134 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12-15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 104 credits
(This includes 12-15 credits of General Education courses 6 credits of GA courses; 3 credits of GS courses; 3-6 credits of GH courses.)

PRESCRIBED COURSES (57 credits)[1]
A ED 201W(3), A ED 211 GA(3), A ED 212(1), ART H 112 GA;IL(3) (Sem: 3-4)
Art History

University Park, College of Arts and Architecture (ART H)

PROFESSOR CRAIG ZABEL, Head, Department of Art History

The art history major is designed to provide students with a solid background in the history of art. The histories of painting, sculpture, architecture, design, and the graphic arts are examined in relation to such contextual issues as religion, politics, society, gender, economics, philosophy, and culture. Students who pursue the Bachelor of Arts in art history will acquire a thorough humanistic education that involves writing, speaking, and participating in group discussions, as well as developing a facility in at least one foreign language. Majors are also encouraged to pursue a study abroad experience.

The major provides students with a solid liberal arts background and is an excellent preparation for the further study of art history or other related fields in graduate school. With a B.A. in art history, graduates have found employment in museums, galleries, publishing, arts agencies, visual resources, archives/libraries, archaeology, historic preservation, and historic sites. The two most common careers for art historians are teaching at the college level or working in a museum (as a curator, registrar, director, etc.). These careers typically require graduate degrees.

For the B.A. degree in Art History, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 19 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

PRESCRIBED COURSES (9 credits)
ART H 111 GA;IL(3), ART H 112 GA;IL(3) (Sem: 1-4)
ART H 350W(3) (Sem: 5-8)

ADDITIONAL COURSES (15 credits)
(At least 12 credits must be taken at the 400 level, ART H 297, ART H 397, and ART H 497 also may be used to fulfill the additional course requirements when the subject matter is appropriate. Any one course may not be double counted for more than one category.)
Select 3 credits (Non-Western Intro) from ART H 120 GA;IL(3), ART H 130 GA:US;IL(3), ART H 140 GA;IL(3) (Sem: 1-4)
Select 3 credits (Architectural History Intro) from ART H 201 GA;IL(3), ART H 202 GA;US;IL(3), or ART H 330 GA;IL(3) (Sem: 1-4)
Select 3 credits (Africa/Asia/Oceania/Pre-Columbian Americas) from ART H 120 GA;IL(3), ART H 130 GA:US;IL(3), ART H 140 GA;IL(3), ART H 315 GA;IL(3), ART H 440 IL(3-9), ART H 445 IL(3), ART H 446 IL(3), ART H 447 IL(3) or ART H 460 IL(3) (Sem: 3-8)
Select 3 credits (Ancient/Byzantine/Medieval) from ART H 301 GA;IL(3), ART H 302 GA;IL(3), ART H 311 GA;IL(3), ART H 312 GA;IL(3), ART H 401 IL(3-9), ART H 402 IL(3), ART H 411 IL(3), ART H 412 IL(3), ART H 420 IL(3), ART H 422 IL(3), ART H 426 US;IL(3), ART H 442 IL(3), or ART H 452 IL(3) (Sem: 3-8)
Select 3 credits (Renaissance/Baroque/Modern/Contemporary) from ART H 225 GA;GH(3), ART H 250(3), ART H 303 GA;IL(3), ART H 304 GA;IL(3), ART H 305 GA;IL(3), ART H 307 GA;US(3), ART H 313 GA;IL(3), ART H 314 GA;IL(3-6), ART H 325 GA;IL(3), ART H 326 GA;IL(3), ART H 405 US;IL(3-6), ART H 410(3), ART H 414 IL(3), ART H 415 US(3), ART H 416 US(3), ART H 420 IL(3), ART H 423 IL(3-9), ART H 424 IL(3), ART H 426 US;IL(3), ART H 429 IL(3), ART H 435 IL(3-6), ART H 450 US;IL(3), ART H 456 IL(3), ART H 458 IL(3), ART H 462 IL(3), ART H 464 IL(3), ART H 470 US;IL(3), ART H 475 US(3) or ART H 476(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits of art history (excluding ART H 100 GA;IL) (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2009
Blue Sheet Item #: 37-06-054
Review Date: 4/14/09
UCA Revision #2: 7/27/07
LA

Astronomy and Astrophysics

University Park, Eberly College of Science (ASTRO)

PROFESSOR DONALD P. SCHNEIDER, Head

Astronomy involves the study of the properties, physical nature and origins of the planets, stars, galaxies and universe as a whole. It involves development of instrumentation, observations of celestial objects with ground- and space-based telescopes, and interpretation of findings using the mathematical laws of physics such as gravity, electromagnetism and quantum mechanics. The undergraduate major provides a strong and broad foundation in mathematics, physical science and computation as well as a detailed understanding of modern astronomy. Many research opportunities are available to complement the formal classwork. Graduates proceed to advanced degrees in astronomy and other sciences, and into a wide variety of technical professions.

In order to be eligible for entrance to the Astronomy and Astrophysics major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average. 2) Completed ASTRO 291 GN(3), CHEM 110 GN(3), MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), and PHYS 212 GN(4); and earned a grade of C or better in each of these courses.

For the B.S. degree in Astronomy and Astrophysics, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 98 credits
(This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 64 credits

PRESCRIBED COURSES (49 credits)
ASTRO 291 GN(3)[1], ASTRO 292 GN(3)[1], ASTRO 320 GN(2), ENGL 202C GWS(3), MATH 230(4), MATH 251(4), PHYS 237(3) (Sem: 3-4)
CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1] , PHYS 211 GN(4)[1], PHYS 212 GN(4)[1], PHYS 213 GN(2)[1], PHYS 214 GN(2)[1] (Sem: 1-4)

ADDITIONAL COURSES (3 credits)
CMPSC 121 GQ(3), CMPSC 201 GQ(3), or CMPSC 202 GQ(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits[1] from 400-level ASTRO courses except ASTRO 401, ASTRO 402, and ASTRO 496 (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 34 credits

GRADUATE STUDY OPTION: (34 credits)

PRESCRIBED COURSES (10 credits)
PHYS 400(3), PHYS 410(3-4), PHYS 419(3) (Sem: 5-8)

ADDITIONAL COURSES (9-10 credits)
Select 3 credits from MATH 405(3), MATH 411(3), or MATH 417(3) (Sem: 3-4)
Select 6-7 credits from PHYS 401(3), PHYS 402(4), PHYS 406(3), PHYS 411(3), PHYS 420(3), PHYS 457(1-3), PHYS 457W(3), PHYS 461(3), and E E 471(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (14-15 credits)
Select 3 additional credits from advanced courses in computer science and engineering, mathematics, or statistics (Sem: 5-6)
Select 11-12 credits in consultation with adviser from department list (Sem: 3-8)

COMPUTER SCIENCE OPTION: (34 credits)

PRESCRIBED COURSES (9 credits)
ATHLETIC TRAINING

University Park, College of Health and Human Development (ATHTR)

Not all majors are available at every campus. The Athletic Training major will only be offered at University Park campus.

PROFESSOR NANCY I. WILLIAMS, Head, Department of Kinesiology

The Athletic Training major provides a concentrated program of courses designed to prepare students for a career in the profession of athletic training. This major has been designed to meet the standards for national certification by the Board of Certification (BOC) and legal certification by the Commonwealth of Pennsylvania.

Students are admitted into the program on a competitive basis following completion of prerequisite courses (see requirements for admission). Students must also meet the "Technical Standards for the Undergraduate Athletic Training Program at Penn State University" related to the physical and psycho-emotional demands placed upon students in the major. Upon admission, students complete a 5-semester sequence of coursework and supervised clinical rotations. Students typically commit 200 to 300 hours to clinical practical experiences in each of the last 4 semesters of the program. The Technical Standards course sequencing and prerequisite courses can be found at http://www.hhdev.psu.edu/kines/undergrad/docs/Athletic_Training_Technical_Standards.pdf or obtained through the Department of Kinesiology. Full course descriptions are found in the University Bulletin.

Students seeking to transfer from other colleges or universities will have their transcripts evaluated after acceptance to Penn State to identify those courses and credits that will be applied to completion of degree requirements. Coursework specific to athletic training will not be considered for transfer unless completed in a Commission on Accreditation of Athletic Training Education (CAATE) accredited athletic training education program.

The Athletic Training major requires a minimum of 120 credits for graduation. Upon graduation and successful completion of the national BOC examination, students may seek employment in various professional settings including: professional sports, colleges and universities, secondary schools, hospitals, sports medicine clinics, industrial settings plus many more.

Minimum Requirements for Admission to the Athletic Training major (admission is competitive--meeting minimum requirements does not assure admission into the major):

1. Submission of printable online Athletic Training (AT) Program Application
2. Cumulative grade-point average of 2.5.
3. 3.0 grade-point average in KINES 135(3), KINES 202(4), KINES 231(3), KINES 233(3).
4. Completion of entrance interview with Athletic Training Program Director or designee.
5. Evidence of ability to meet the physical and psycho-emotional standards as outlined in the "Technical Standards for the Undergraduate Athletic Training Program at Penn State."

Additional information about the major, including Technical Standards, the Athletic Training (AT) Program Application, course sequencing, and prerequisites can be found at: http://www.hhdev.psu.edu/kines/undergraduate/athletic-training or obtained through the Department of Kinesiology. Full course descriptions are found in the University Bulletin.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. BB H requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)
GENERAL EDUCATION: 45 credits  
(21 of these credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:  
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR:  96-100 credits  
(This includes 21 credits of General Education courses: 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses; 3 credits of GHA courses).

ELECTIVES: 0-1 credits

PRESCRIBED COURSES  
(81 credits) [1]
MATH 022 GQ(3), CHEM 111 GN(1), KINES 135(3), PSYCH 100 GS(3) (Sem: 1-2)  
BIOL 141 GN(3), KINES 231(3), KINÉS 233(3) (Sem: 3)  
KINES 322(3), KINES 334(3) (Sem: 4)  
KINES 335(3), KINES 395F(3), KINES 434(3) (Sem: 5)  
KINES 336(3), KINES 395G(3), KINES 435G(3), KINES 436(4) (Sem: 6)  
KINES 395I(3), KINES 438W(3) (Sem: 7)  
KINES 495F(3) (Sem: 8)

ADDITIONAL COURSES  
(15-19 credits) [1]
Select 3-5 credits: CHEM 106 GN(5); CHEM 110 GN(3) (Sem: 1-2)  
Select 3 credits: KINES 100(3); KINES 141 US;IL(3) (Sem: 1-4)  
Select 3 credits: KINES 101(3); KINES 180(3) (Sem: 1-4)  
Select 3-4 credits: PHYS 150 GN(3); PHYS 250 GN(4) (Sem: 3-4)  
Select 3-4 credits: STAT 200 GQ(4); STAT 250 GQ(3); SCM 200 GQ(4); (Sem: 3-4)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-03-042

Review Date: 11/17/2015

Biobehavioral Health

University Park, College of Health and Human Development (BB H)  
University College: Penn State Greater Allegheny, Penn State New Kensington

PROFESSOR COLLINS O. AIRHIHENBUWA, Head of the Department

This major provides interdisciplinary training designed to integrate biological, behavioral, and social science approaches to the study of human health and illness. Emphasis is placed on the study of physical health. The goal of this major is to help students gain working familiarity with multiple perspectives, approaches, and methods needed to address and solve problems of human health and illness. Students may select courses in the supporting courses category that will fulfill requirements for admission to graduate and professional programs. This major helps prepare graduates for entry-level jobs in a range of biomedical and health-related areas, including roles as research assistants, laboratory managers, biomedical product representatives, technical support positions in biomedical and health-related fields. This major also will provide excellent preparation for advanced study in natural and social science disciplines and related professional areas such as epidemiology, public health, environmental health and safety, and human services.

For the B.S. degree in Biobehavioral Health, a minimum of 120 credits is required.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. BB H requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits  
(22 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:  
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)
WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credits

REQUIREMENTS FOR THE MAJOR: 97-99 credits
(This includes 21-22 credits of General Education courses: 3-4 credits of GQ courses; 9 credits of GN courses; 6 credits of GS courses; 3 credits of GHA courses.)

PRESCRIBED COURSES (31 credits)
BIOL 110 GN(4) (Sem: 1-3)  
BB H 101 GHA(3)[1], BIOL 141 GN(3)[1], NUTR 251 GHA(3), PSYCH 100 GS(3)[1] (Sem: 1-4)  
BB H 310(3)[1], BB H 311(3)[1], BB H 316(3)[1], BB H 411W(3)[1], BB H 440 US;IL(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (51-53 credits)
Select 3 credits from: BIOL 133 GN(3) or BIOL 222(3) (Sem: 1-2)

Select 3-4 credits from: BIOL 230W GN(4)[1] or CHEM 101 GN(3)[1] or CHEM 110 GN(3)[1] or MICRB 106 GN(3)[1] (classes used to fulfill this requirement may not be used to fulfill the 12 credits of basic science below) (Sem: 1-4)

Select 3-4 credits from: STAT 200 GQ(4)[1] or STAT 250 GQ(3)[1] (Sem: 1-2)

Select 3 credits from: BB H 301W(3), PHIL 110 GH(3), PHIL 132 GH(3), RL ST 131 GH(3) (Sem: 5-8)

Select 15 credits from (at least 6 credits must be at the 400 level)[1]: BB H 203(3), BB H 251 US(3), BB H 302 US(3)[1], BB H 305 IL(3), BB H 315 US(3)[1], BB H 324(3), BB H 368(3)[1], BB H 390A(3), BB H 402 IL(3), BB H 407 IL(3), BB H 410(3)[1], BB H 416(3)[1], BB H 417(3), BB H 432(3)[1], BB H 446(3)[1], BB H 451(3)[1], BB H 452 US(3), BB H 458 GS(3)[1], BB H 468(3), BB H 469(3)[1], BB H 470(3)[1], BB H 490(3) (Sem: 5-8)


Select 3 credits from: HD FS 129 GS(3), HD FS 229 GS(3), HD FS 239 GS(3), or HD FS 249 GS(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 3 credits in health promotion at 400 level from approved list, in consultation with adviser (Sem: 5-8)
Select 12 credits in University-wide offerings from approved list, in consultation with advisor (Students may apply 6 credits of ROTC.) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-02-031
Review Date: 10/13/2015
UCA Revision #: 9/20/06
HH
Dept head updated: 9/9/10

Biochemistry and Molecular Biology

Penn State Berks (BMBBL)  
University Park, Eberly College of Science (B M B)

PROFESSOR Wendy Hanna-Rose, in charge

Students in this major apply basic principles of chemistry and physics to the study of living cells and their components to explain biology at molecular, genetic, and cellular levels. Students will develop a strong foundation in quantitative and analytical biological sciences, including molecular biology, biochemistry, enzymology, metabolism, cell biology, and molecular genetics. The Biochemistry Option is offered for students who have interests in the structures, properties and functions of macromolecules, and in the quantitative and analytical techniques used to characterize these macromolecules. The Molecular and Cell Biology Option is available to students whose interests relate to the growth, reproduction and differentiation of cells and to signaling processes that occur in multicellular systems that activate and modulate these processes. The curriculum is designed to prepare students for advanced study leading to careers in research, medicine, and education, or to secure employment in biotechnology and health-related industries, including...
government, academic, and private laboratories.

In order to be eligible for entrance to the Biochemistry and Molecular Biology major, a student must have: 1) attained at least a 2.00 cumulative grade-point average, and 2) completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), and MATH 140 GQ(4); and 3) earned a grade of C or better in each of these courses.

For the B.S. degree in Biochemistry and Molecular Biology, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 95 credits
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 55 credits

PRESCRIBED COURSES (53 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4), MATH 141 GQ(4), PSU 016(1) (Sem: 1-2)
B M B 251(3), B M B 252(3), B M B 424(3), B M B 429(2), CHEM 210(3), CHEM 212(3), CHEM 213(2), MICRB 201(3), MICRB 202(2) (Sem: 3-4)
B M B 400(2), B M B 401(3), B M B 402(3), B M B 443W(3) (Sem: 5-6)

ADDITIONAL COURSES (2 credits)
B M B 445W(2) or B M B 448(2) (Sem: 7-8)

REQUIREMENTS FOR THE OPTION: 40 credits

BIOCHEMISTRY OPTION: (40 credits)

PRESCRIBED COURSES: (21 credits)
PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) (Sem: 2-4)
CHEM 450(3), CHEM 452(3) (Sem: 5-8)
B M B 474(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS: (19 credits)
Select 7-9 credits from any 400-level B M B/CHEM/MICRB course with a total maximum of 4 credits in B M B 488 and/or B M B 496 (Sem: 5-8)
Select 2-3 credits in the mathematical sciences from department list B (Sem 5-8)
Select 7-10 credits from department list C (Sem: 5-8)

MOLECULAR AND CELL BIOLOGY OPTION: (40 credits)

PRESCRIBED COURSES: (9 credits)
B M B 430(3), B M B 460(3) (Sem: 5-8)
MICRB 410(3) (Sem: 5-8)

ADDITIONAL COURSES: (11-18 credits)
PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 1-4)
CHEM 450(3), CHEM 452(3); or B M B 428(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS: (13-20 credits)
Select 5-6 credits from any 400-level B M B/CHEM/MICRB course with total maximum of 4 credits in B M B 488 and/or B M B 496 (Sem: 5-8)
Select 2-3 credits in the mathematical sciences from department list B (Sem: 5-8)
Select 4-13 credits from department list C (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[85] To graduate, a grade of C or better is required in two of the following courses: MICRB 201, B M B/MICRB 251, B M B/MICRB 252.
[86] To graduate, a grade of C or better is required in 9 credits of any B M B or MICRB 400-level course except B M B 442, B M B 443W, B M B 445W, B M B 446, B M B 448, B M B 488, B M B 496, MICRB 421W, MICRB 422, MICRB 447.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-110
Review Date: 08/20/13
UCA Revision #1: 8/2/06
SC
Biological Anthropology

University Park, College of the Liberal Arts (BANTH)

PROFESSOR GEORGE R. MILNER, Head, Department of Anthropology
(The Bachelor of Science degree in Biological Anthropology is offered by the Biological Anthropology Program in the Department of Anthropology.)

The Bachelor of Science degree provides the opportunity to develop a strong foundation in research methods, quantification, and laboratory science. It prepares students with the skills and competencies needed to pursue graduate study or careers in professions associated with biological anthropology and related fields. Students contemplating futures in biomedical or forensic sciences should consult with Penn State's Premedicine Office or the specific forensic science graduate program to make certain that additional courses in organic chemistry and physics that are required for admission are completed.

For the B.S. degree in Biological Anthropology, a minimum of 122 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

GENERAL EDUCATION: 45 credits
(13 of these credits are included in REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 23-30 credits

REQUIREMENTS FOR THE MAJOR: 67 credits
(This includes 13 credits of General Education courses: 9 credits GN courses; 4 credits GQ courses.)

PRESCRIBED COURSES (17 credits)
ANTH 002 GS(3), ANTH 021 GN(3), ANTH 045 GS;US;IL(3), BIOL 110 GN(4), STAT 200 GQ(4) (Sem: 1-6)

ADDITIONAL COURSES (50 credits)
Select an additional 18 credits in ANTH elective courses other than ANTH 001, (no more than 9 credits from 190-199, 290-299, 390-399, and 490-499 other than 297 and 497) (Sem: 1-8)
Select 15 Biological Anthropology credits from the following ranges: ANTH 401-419(3) or ANTH 460-473(3) (Sem: 3-8)
Select 8 credits from the following: BIOL 129 GN(4), BIOL 230W GN(4), BIOL 240W GN(4), or KINES 202(4) (Sem: 3-8)
Select 9 credits from the following: B M B 251(3), B M B 401(3), B M B 484(3), B M B 485(3), BIOL 141 GN(3), BIOL 411(3), BIOL 472(3), (Sem: 3-8)

NOTE: Internships will be counted as elective credits.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015
UCA Revision #: 8/2/06
Dept head updated by Publications: 10/19/11
LA

Biological Engineering

University Park, College of Agricultural Sciences
University Park, College of Engineering (B E)

PROFESSOR PAUL H. HEINEMANN, Head of the Department of Agricultural and Biological Engineering

This major helps prepare students for careers involving the application of engineering principles to agricultural and biological production systems, processing systems, and conservation of land and water resources. Education in mathematics, physics, and engineering sciences common to all engineering disciplines is provided along with specialized training in biological and agricultural sciences. The curriculum covers all areas of biological engineering, including development of machines for biological processing and agriculture, postharvest handling and processing, natural resource management and utilization, biological processes, food engineering, and structures and their environmental modifications. A student must select the Agricultural Engineering option, Food and Biological Processing Engineering option or the Natural Resources Engineering option.

Program Educational Objectives:

Early career Biological Engineering graduates will be expected to:
1. Demonstrate proficiency in basic and engineering sciences related to biological processing, natural resource, and agricultural engineering fields;
2. Effectively identify, analyze and design sustainable solutions to address issues and opportunities throughout the world;
3. Have the ability to work in teams and effectively communicate within and outside the profession;
4. Demonstrate strong leadership skills, ethical integrity, and professional engagement

Program Outcomes (Student Outcomes):
Upon graduation Biological Engineering students will have:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs
d. an ability to function on multi-disciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context
i. a recognition of the need for an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Principles of engineering design experiences are integrated throughout the junior-year curriculum by having students solve problems typical of those encountered in the agricultural and biological engineering profession. A year-long major design experience in the senior year emphasizes that biological engineers must learn not only how to develop engineering solutions to unique, practical problems using the newest technology, but also to assess and integrate the social and ethical implications of their solutions.

Careers for graduates include design, development, and research engineering positions involving biological processes, machinery development, natural resources management, materials handling, biological product development, and structural systems for animals, plants, and crop storage. Biological engineers are employed in industry, consulting firms, and governmental agencies in the United States and abroad. Graduates deal with the various engineering aspects associated with production and processing of food, fiber, and other biological materials, within the constraints of environmental protection and natural resource conservation.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Biological Engineering, a minimum of 129 credits is required. The baccalaureate program in Biological Engineering at University Park is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27-28.5 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 111-112.5 credits
(This includes 27-28.5 credits of General Education courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses; and 1.5 credits of GHA courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 75 credits

PRESCRIBED COURSES (68 credits)
CHEM 110 GN(3)\[1], CHEM 111 GN(1), E MCH 211(3)\[1], EDSGN 100(3), ENGL 015 GWS(3), MATH 140 GQ(4)\[1], MATH 141 GQ(4)\[1], PHYS 211 GN(4)\[1] (Sem: 1-2)
E MCH 212(3)\[1], E MCH 213(3)\[1], M E 300(3)\[1], MATH 231(2), MATH 251(4)\[1], PHYS 212 GN(4)\[1] (Sem: 3-4)
B E 301(3)\[1], B E 302(4)\[1], B E 304(3)\[1], B E 305(3)\[1], B E 308(3)\[1], B E 39T GWS(2) (Sem: 5-6)
B E 392 GWS(2), B E 460(1), B E 466W(3) (Sem: 7-8)

ADDITIONAL COURSES (7 credits)
CAS 100A GWS(3) or CAS 100B GWS(3)
Select 1 credit of First-Year Seminar (Sem: 1-2)
AG BM 101 GS(3) or ECON 102 GS(3), or ECON 104 GS(3) (Sem: 3-4)

REQUIREMENTS FOR THE OPTIONS: 36-37.5 credits
AGRICULTURAL ENGINEERING OPTION: (36 credits)

ADDITIONAL COURSES (6 credits)
C E 360(3) [1] or M E 320(3) [1] (Sem: 5-6)
I E 424(3) or STAT 401(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (30 credits)
Select 3 credits in math/basic science [26] (Sem: 3-6)
Select 6 credits from B E 303(3) [1], B E 306(3) [1], B E 307(3) [1] (Sem: 5-6)
Select 6 credits in engineering science/design [26] (Sem: 5-8)
Select 3 credits in agricultural/biological science [26] (Sem: 7-8)
Select 6 credits in biological engineering [26] (Sem: 7-8)
Select 6 credits in technical selection [26] (Sem: 7-8)
(Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHA category upon completion of the ROTC program.)

FOOD AND BIOLOGICAL PROCESSING ENGINEERING OPTION: (37.5 credits)

PRESCRIBED COURSES (16.5 credits)
B M B 211(3), CHEM 202(3), NUTR 100 GHA(1.5) (Sem: 5-6)
B E 465(3), B E 468(3), I E 424(3) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
C E 360(3) [1] or M E 320(3) [1] (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 6 credits in emphasis technical elective [26] (Sem: 7-8)
Select 6 credits in any engineering science/design [26] (Sem: 7-8)
Select 6 credits in technical selection [26] (Sem: 7-8)
(Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHA category upon completion of the ROTC program.)

NATURAL RESOURCES ENGINEERING OPTION: (36 credits)

PRESCRIBED COURSES (21 credits)
SOILS 101 GN(3) (Sem: 1-4)
A S M 309 (3) [1], B E 307(3) [1], C E 360(3) [1] (Sem: 5-6)
B E 467(3), B E 477(3), B E 487(3) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
I E 424(3) or STAT 401(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 6 credits in engineering science/design [26] (Sem: 5-8)
Select 3 credits in biological/environmental sciences [26] (Sem: 7-8)
Select 3 credits in technical selection [26] (Sem: 7-8)
(Students may apply 3 credits of ROTC to the technical selection category and 3 credits to the GHA category upon completion of the ROTC program.)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[26] Courses to be selected from a list approved by the Agricultural and Biological Engineering faculty. These courses must be chosen so that the engineering design and engineering science requirements for the major are met.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015
R & T: Approved 5/24/2013
UCA Revision #1: 8/2/06
UCA Revision #2: 7/26/07

Comments
EN

Biology

Abington College (BIOAB)
Altoona College (BIOAL)
Berks College (BIOBL)
Capital College (BIOCA)
University Park, Eberly College of Science (BIOL)
University College, Penn State Brandywine, Penn State Schuylkill, Penn State York (BIOCC)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

Carla Hass, Person-In-Charge

The curriculum in Biology is planned for preparation for professions requiring competence in biological science or for
gaining an understanding of the world of living things. The professional group includes students who intend to secure advanced degrees through graduate study, students who are interested in work with various governmental agencies or industries having biological responsibilities, and students who want to prepare for careers in medicine or other health-related professions. Students whose interests are not professional select the curriculum because its broad approach can result in an educated view of the structure and function of living things. Achievement of these goals, including a special interest in a particular area of biology, can be met by selecting one of five options offered by the Department of Biology that will lead to the B.S. degree in Biology. The options and their key areas are: 1) Plant Biology--morphology, systematics, and physiology of plants and fungi; 2) Ecology--behavior, and population and community biology of plants and animals; 3) General Biology--all aspects of modern biology; 4) Genetics and Developmental Biology--genetics, genetic engineering, and plant and animal development; 5) Neuroscience--development, biochemistry, physiology and aging of the central and peripheral nervous system; 6) Vertebrate Physiology--pre-medicine, pre-dentistry, pharmacology, and animal physiology.

In order to be eligible for entrance to the Biology major, a student must have: 1) attained at least a 2.00 cumulative grade point average; 2) completed BIOL 110 GN(4), CHEM 110 GN(3), MATH 140 GQ(4), and earned a grade of C or better in each of these courses; and 3) completed at least one of the following courses with a grade of C or better: BIOL 220W GN(4), BIOL 230W GN(4), or BIOL 240W GN(4).

TO VIEW THE **Biology Minor (BIOL)**

For the B.S. degree in Biology, a minimum of 124 credits is required.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**GENERAL EDUCATION:** 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**REQUIREMENTS FOR THE MAJOR:** 94 credits
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

**COMMON REQUIREMENTS FOR MAJOR (ALL OPTIONS):** 40-44 credits

**PRESCRIBED COURSES** (32 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3)[1], CHEM 113 GN(1), MATH 140 GQ(4)[1], MATH 141 GQ(4) (Sem: 1-2)
BIOL 110 GN(4)[1], BIOL 220W GN(4)[1], BIOL 230W GN(4)[1], BIOL 240W GN(4)[1] (Sem: 1-4)

**ADDITIONAL COURSES** (8-12 credits)
PHYS 250 GN(4), PHYS 251 GN(4); or PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) (Sem: 5-6)

**REQUIREMENTS FOR THE OPTION:** 50-54 credits

**ECOLOGY OPTION:** (50-54 credits)

**ADDITIONAL COURSES** (30-33 credits)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)
Select 3-4 credits from STAT 200 GQ(4) or STAT 240 GQ(3) or STAT 250 GQ(3) (Sem: 3-4)
Select 3 credits from STAT 462(3) or STAT 464(3) (Sem: 7-8)
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups (courses in Group IV--except BIOL 496, SC 295, SC 395, SC 495--may be used to satisfy requirements in other groups) (Sem: 5-8)

Group I: BIOL 412(3), BIOL 419(3), BIOL 435(3), BIOL 436(3), BIOL 444(3), BIOL 450W(3-5), BIOL 463(3), BIOL 482(3-4), BIOL 499A IL(3)

Group II: BIOL 414(3), BIOL 427(3), BIOL 428(3), BIOL 429(3), BIOL 448(3), BIOL 464(3), BIOL 474(3)

Group III: BIOL 406(3), BIOL 415(3), BIOL 417(4), BIOL 446(3), PPEM 425(4)

Group IV: BIOL 414(3), BIOL 417(4), BIOL 419(3), BIOL 444(3), BIOL 448(3), BIOL 450W(3-5), BIOL 482(3-4), BIOL 496(3), BIOL 499A IL(3), PPEM 425(4), SC 295(1-3), SC 395(1-3), SC 495(1-3) (A maximum of 3 credits of BIOL 496 or 4 credits of SC 295, SC 395, SC 495 may be used to fulfill the 18-credit minimum in the 400-level biology course requirement.)

**SUPPORTING COURSES AND RELATED AREAS** (17-24 credits)
Select 17-24 credits from department list (Sem: 1-8)

**GENERAL BIOLOGY OPTION:** (50-54 credits)

**ADDITIONAL COURSES** (24-27 credits)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3), or STAT 250 GQ(3) (Sem: 3-4)
Select a minimum of 18 credits of 400-level biology courses, with at least 3 credits from each of the following groups (each course may be used to satisfy a requirement in only one group) (Sem: 5-8)


SUPPORTING COURSES AND RELATED AREAS (23-30 credits)
Select 23-30 credits from department list (Sem: 1-8)

GENETICS AND DEVELOPMENTAL BIOLOGY OPTION: (50-54 credits)

PRESCRIBED COURSES (19 credits)
CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)
BIOL 322(3), BIOL 430(3) (Sem: 5-6)
B M B 401(2), B M B 402(3) (Sem: 5-8)

ADDITIONAL COURSES (17-21 credits)
Select 2-5 credits from MATH 220 GQ(2-3), MATH 231(2), MICRB 201(3), MICRB 202(2) (Sem: 3-6)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3), STAT 250 GQ(3), or STAT 319(3) (Sem: 5-6)
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III (Sem: 5-8)


SUPPORTING COURSES AND RELATED AREAS (10-18 credits)
Select 10-18 credits from department list (Sem: 1-8)

NEUROSCIENCE OPTION: (50-54 credits)

PRESCRIBED COURSES (19 credits)
B M B 401(2), B M B 402(3) (Sem: 5-8)
CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)

ADDITIONAL COURSES (15-16 credits)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3), STAT 250 GQ(3), or STAT 319(3) (Sem: 5-6)
Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III (Sem: 5-8)


SUPPORTING COURSES AND RELATED AREAS (15-20 credits)
Select 15-20 credits from department list (Sem: 1-8)

PLANT BIOLOGY OPTION: (50-54 credits)

PRESCRIBED COURSES (22 credits)
CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)
B M B 401(2), B M B 402(3), BIOL 407(3), BIOL 414(3), BIOL 441(3) (Sem: 5-8)

ADDITIONAL COURSES (12-13 credits)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3), STAT 250 GQ(3), or an advanced statistics course (Sem: 3-4)
Select a minimum of 9 credits of 400-level biology courses, with at least 6 credits from Group I and 3 credits from Group II (Sem: 5-8)


Group II -- BIOL 400(1-3), BIOL 414(3), BIOL 419(3), BIOL 439(3), BIOL 444(3), BIOL 448(3), BIOL 450W(3-5), BIOL 461(3), BIOL 496(1-3), BIOL 499A IL(3), SC 295(1-3), SC 395(1-3), SC 495(1-3)

**SUPPORTING COURSES AND RELATED AREAS** (15-20 credits)
Select 15-20 credits from department list (Sem: 1-8)

**VERTEBRATE PHYSIOLOGY OPTION:** (50-54 credits)

**PRESCRIBED COURSES** (18 credits)
CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)
B M B 401(2), B M B 402(3), BIOL 472(3), BIOL 473(2) (Sem: 5-8)

**ADDITIONAL COURSES** (15-16 credits)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3), or STAT 250 GQ(3) (Sem: 5-8)

Select a minimum of 12 credits of 400-level courses, with at least 6 credits from Group I, 3 credits from Group II, and 3 credits from Group III (Sem: 5-8)

Group I -- BIOL 404(3), BIOL 406(3), BIOL 409(3), BIOL 411(3), BIOL 412(3), BIOL 413(3), BIOL 416(3), BIOL 421(4), BIOL 426(3), BIOL 430(3), BIOL 432(3), BIOL 437(4), BIOL 443(3), BIOL 446(3), BIOL 460(3), BIOL 469(3), BIOL 470(3), BIOL 471(3), BIOL 479(3) (may select up to 6 credits from department list)


**SUPPORTING COURSES AND RELATED AREAS** (16-21 credits)
Select 16-21 credits from department list (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-06-520
Review Date: 4/10/07
UCA Revision #1: 8/2/06
UCA Revision #2: 7/26/07

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**Biomedical Engineering**

*University Park, College of Engineering (BME)*

**PROFESSOR CHENG DONG, Head of the Department of Biomedical Engineering**

The Biomedical Engineering curriculum emphasizes the continuous integration of classical and modern engineering principles with the life sciences and health care. Biomedical Engineers apply these skills to innovation in the health care industry, basic biological sciences, and the underpinning of medical practice.

Consistent with the mission of Penn State University and the College of Engineering, the Penn State Bachelor of Science program in Biomedical Engineering aims to create world-class engineers who will, after graduation, contribute to social and economic development through the application of engineering to the solution of problems in medicine and biology.

**Program Educational Objectives**

Three to five years after graduation, we expect our graduates to be:

- employed in industry and government positions which include, but are not limited to, research and development, regulation, manufacturing, quality assurance and sales and marketing, or,
- enrolled in graduate school, continuing education, or other professional development programs related to biomedical sciences and engineering, or,
- enrolled in medical school, dental school, or other health-related professional training programs.

**Program Outcomes (Student Outcomes)**

Upon graduation from the Biomedical Engineering program, students will have:

1. An ability to apply knowledge of advanced mathematics, (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology
2. An ability to design and conduct experiments, as well as to analyze and interpret data from living and non-living systems
An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

3. An ability to function on multi-disciplinary teams

4. An ability to identify, formulate, and solve engineering problems

5. An understanding of professional and ethical responsibility

6. An ability to communicate effectively

7. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

8. A recognition of the need for, and an ability to engage in, life-long learning

9. A knowledge of contemporary issues

10. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

11. An understanding of physics, chemistry, and of physiology at molecular, cellular and organ levels

12. An ability to address problems associated with the interaction between living and non-living materials and systems

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Biomedical Engineering, a minimum of 130-131 credits are required. The baccalaureate program in Biomedical Engineering at University Park is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Students in residence at the Commonwealth campuses may satisfy the course requirements for semesters 1-3. They should then transfer to University Park to begin studies in their major beginning with semester 4.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of the Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 112-113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 89 credits

PRESCRIBED COURSES (72 credits)
EDSGN 100(3) (Sem: 1-2)
CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1) (Sem: 1-2)
MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1] (Sem: 1-2)
CMPSC 200 GQ(3), E MCH 210(5), MATH 230(4), MATH 251(4)[1], PHYS 212 GN(4)[1] (Sem: 3-4)
BME 201(3)[1] (Sem: 4)
BME 301(4)[1], BME 303(3)[1], BME 313(3)[1], BME 401(3)[1], BME 402(3)[1], BME 403(1) (Sem: 5-6)
ENGL 202C GWS(3) (Sem: 5-6)
BME 429(2), BME 440(1), BME 450W(3) (Sem: 7-8)

ADDITIONAL COURSES (14 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
ECON 102 GS(3), or ECON 104 GS(3) (Sem: 1-2)
BIOL 141 GN(3)[1], BIOL 142(1)[1], or BIOL 240W(4)[1] (Sem: 3-4)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 4-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits from Science or Engineering Elective courses from departmental list (Sem: 7-8)

REQUIREMENTS FOR THE OPTION: 23-24 credits

BIOCHEMICAL OPTION: (24 credits)
PRESCRIBED COURSES (9 credits)
BME 403(3), BME 413(3) (Sem: 5-6)
BME 423(3) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
CHEM 202(3) or CHEM 210(3) (Sem: 4-6)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 9 credits from Biochemical Option department list (Sem: 6-8)
Select 3 credits from Related Electives department list (Sem: 6-8)
MEDICAL IMAGING AND DEVICES OPTION: (23 credits)

PRESCRIBED COURSES (7 credits)
E E 210(4) (Sem: 3-4)
BME 406(3) (Sem: 5-6)

ADDITIONAL COURSES (4 credits)
CMPEN 271(3) and CMPEN 275(1) or CMPEN 270(4) or E E 310(4) or E E 330(4) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 6 credits from the Related Electives department list (Sem: 6-8)
Select 6 credits from Medical Imaging and Device Option department list (Sem: 7-8)

BIOMATERIALS OPTION: (24 credits)

PRESCRIBED COURSES (12 credits)
MATSE 201(3), BME 409(3), BME 443(3) (Sem: 5-6)
BME 446(3) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
CHEM 202(3) OR CHEM 210(3) (Sem: 4-6)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits from Related Electives department list (Sem: 6-8)
Select 6 credits from Biomaterials Option department list (Sem: 7-8)

BIOMECHANICS OPTION: (24 credits)

PRESCRIBED COURSES (9 credits)
E MCH 212(3), E MCH 315(2), E MCH 316(1) (Sem: 4-6)
BME 409(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 9 credits from Biomechanics Option department list (Sem: 6-8)
Select 6 credits from Related Electives department list (Sem: 6-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

BioRenewable Systems

University Park, College of Agricultural Sciences (BRS)

PROFESSOR NICOLE BROWN, Program Coordinator

The BioRenewable Systems Major is an applied major that intertwines the study of engineering technology, natural resources, and agriculture with fundamentals of business, entrepreneurship, and management. Administered through the Department of Agricultural and Biological Engineering, the BioRenewable Systems (BRS) program uniquely prepares students to solve 21st century problems and attain careers in both traditional sectors and those relating to the emerging bioeconomy. Students in this program will secure: (1) knowledge of fundamental sciences related to resources, processes, and products in biorenewable systems; (2) communication and managerial skills relevant to careers in product development, technology, sales, marketing and management; and (3) the ability to apply systems analysis skills, positioning them for effective problem solving and leadership in the agricultural and bioproducts industries.

Graduates are typically employed as sales and field representatives, financial and technical consultants, and technical service or quality assurance personnel in renewable bioproducts or related agricultural sectors such as: power and machinery systems, forest products, food production, bioprocessing, environmental systems, wood structures, bioenergy, co-product development, and agrochemicals. Graduates may continue their education in a graduate program with a science, engineering, or business orientation.

The BRS major has two options: Agricultural Systems Management (ASM) and BioProducts (BP).

Agricultural Systems Management Option
This option applies a technological approach to understanding and managing agricultural production systems to meet economical and sustainable needs. Basic study is emphasized in the agricultural and business management sciences, along with the application of the technical results of engineering research, design, and manufacturing. Graduates of this option apply their technology and management training to the diverse areas of food and fiber production; bioprocessing; and land, water, and air resources.

BioProducts Option
The scientific nature of biobased resources—their unique design, sustainability, and renewability—constitutes the core
of this option. Building upon that foundation, students will learn techniques for converting and efficiently utilizing these materials to maximize product life cycles, while simultaneously exploring relevant marketing and management strategies. Technical electives for this option emphasize material sciences, engineering, and/or business. Career tracks are broad, ranging from traditional forest products companies to emerging sectors, including bioenergy co-products.

For the B.S. degree in BioRenewable Systems, a minimum of 120 credits is required for the BioProducts Option and minimum of 121 credits is required for the Agricultural Systems Management Option.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 105-109 credits
(This includes 30 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 9 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 73-75 credits

PRESCRIBED COURSES (45 credits)
ACCTG 211(4), CHEM 110 GN(3), CHEM 111 GN(1), EDSDGN 100(3)[1], ENGL 015 GWS(3) (Sem: 1-2)
AG BM 106(3)[1], BRS 221(3)[1], BRS 300(3)[1], BRS 391 GWS(2), BRS 437(4)[1] (Sem: 5-6)
BRS 392 GWS(2), BRS 393(1), BRS 422(3), BRS 426(3), BRS 428(3), BRS 429W(3), BRS 490(1) (Sem: 7-8)

ADDITIONAL COURSES (28-30 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
E B F 200 GS(3) or ECON 104 GS(3) (Sem: 1-2)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)
PHYS 211 GN(4) or PHYS 250 GN(4) (Sem: 1-2)
AG BM 101 GS(3) or ECON 102 GS(3) (Sem: 3-4)
BIOL 110 GN(4) or BIOL 011 GN(3) and BIOL 012 GN(1) (Sem: 3-4)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
STAT 200 GQ(4) or STAT 240 GQ(3) (Sem: 3-4)
B A 241(2) and B A 242(2); or B A 243(4) or B LAW 243(3) (Sem: 3-4)

REQUIREMENTS FOR THE OPTIONS: 32-34 credits

AGRICULTURAL SYSTEMS MANAGEMENT OPTION: 33-34 credits

PRESCRIBED COURSES (9 credits)
SOILS 101 GN(3) (Sem: 3-4)
A S M 310(3)[1], A S M 327(3)[1] (Sem: 5-6)

ADDITIONAL COURSES (6-7 credits)
AGRO 028(3) or HORT 101 GN(3) (Sem: 3-4)
AN SC 100 GN(3); AN SC 201(4); AN SC 207/FD SC 207(2), AN SC 208/FD SC 208(1) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 18 credits of specialization courses in consultation with an advisor. At least 12 credits must be at 200-400 level.
(Sem: 5-8)

BIOPRODUCTS OPTION: 32 credits

PRESCRIBED COURSES (14 credits)
BRS 411(4), BRS 417(4) (Sem: 5-6)
BRS 402(3)[1], BRS 423(3), (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 3 credits in leadership/entrepreneurship. (Sem: 5-6)
Select 15 credits of specialization courses in consultation with an advisor. At least 9 credits must be at 200-400 level.
(Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2016
Blue Sheet Item #: 44-06-001
Review Date: 04/5/2016
Biotechnology may be broadly defined as the application of principles of molecular and cell science in the production of biologically important or industrially useful products. Therefore, students in the Biotechnology major will (1) acquire a strong foundation in the life and chemical sciences, (2) learn how fundamental science is applied to problems through biotechnology, (3) develop basic laboratory skills, perform standard techniques, work with state-of-the-art instrumentation, describe and evaluate analytical methodology used in biotechnology, and (4) become familiar with societal concerns and governmental regulations regarding the biotechnology industry. One very important strength of this major is the extensive laboratory experience each student receives. In the General option, students are very strongly encouraged to consider Cooperative Education with industry as an integral part of their curriculum. In addition to the General option in Biotechnology, the major also offers the Clinical Laboratory Science option.

In order to be eligible for entrance to the Biotechnology major, a student must have: (1) attained at least a 2.00 cumulative grade-point average, and (2) completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), and MATH 140 GQ(4) and earned a grade of C or better in each of these courses.

For the B.S. degree in Biotechnology, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 95 credits
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR MAJOR (ALL OPTIONS): 42 credits

PRESCRIBED COURSES (42 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1)[1], CHEM 112 GN(3)[1], CHEM 113 GN(1), MATH 140 GQ(4)[1], MATH 141 GQ(4), PSU 016(1) (Sem: 1-2)
PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 1-4)
B M B 251(3)[85], B M B 252(3)[85], BIOL 322(3), MICRB 201(3)[85], MICRB 202(2) (Sem: 3-4)
MICRB 421W(3) (Sem: 5-6)

REQUIREMENTS FOR THE OPTION: 53 credits

GENERAL BIOTECHNOLOGY OPTION: (53 credits)

PRESCRIBED COURSES (25 credits)
B M B 211(3), B M B 221(2), B M B 442(3), MICRB 410(3) (Sem: 5-6)
BIOTC 416(2), BIOTC 459(3), BIOTC 479(3), BIOTC 489(3), STAT 250 GQ(3) (Sem: 5-8)

ADDITIONAL COURSES (6-8 credits)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (20-22 credits)
Select 14-16 credits from department list (Sem: 3-8)
Select 6 credits from any 400-level B M B/BIOTC/MICRB lecture course, FD SC 408(2) (Sem: 5-8)

CLINICAL LABORATORY SCIENCE OPTION: (53 credits)
This option provides both the academic and clinical preparation for students interested in a career as a clinical laboratory scientist. Positions are found in hospital, physician-office, reference, industrial, and research laboratories. To complete baccalaureate degree requirements, students enter a ten-month clinical practicum (MICRB 405A-F) at an affiliate hospital for the senior year. (Current affiliations are with Mount Nittany Medical Center, State College and Pennsylvania Hospital, Philadelphia.) Students are recommended for a fixed number of hospital positions on a competitive basis. Cumulative grade-point average and hospital school admission requirements serve as criteria for recommendation. The B.S. degree is awarded at the first commencement following completion of the clinical practicum.

PRESCRIBED COURSES (44 credits)
B M B 211(3), B M B 212(1), B M B 221(2), MICRB 410(3), MICRB 412(3), MICRB 422(2) (Sem: 5-6)
MICRB 405A(8), MICRB 405B(1), MICRB 405C(6), MICRB 405D(5), MICRB 405E(7), MICRB 405F(3) (Sem: 7-8)

ADDITIONAL COURSES (6-8 credits)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (1-3 credits)
Select 1-3 credits from department list (Sem: 3-8)

Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology

The integrated B.S. in Biotechnology-Master of Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Biotechnology program to graduate in five years with the Master of Biotechnology...
degree. The requirements of the Master of Biotechnology degree are designed to prepare students for diverse career opportunities in the burgeoning biotechnology industry. The integrated B.S. Biotechnology-Master of Biotechnology program will enhance the preparation and qualifications of B.S. Biotechnology students seeking entry-level positions in biotechnology and related industries. At the same time, students develop a practical knowledge of the laboratory techniques that underlie current research in the life sciences that will serve as excellent preparation for those students in the Master of Biotechnology program who later decide to pursue further graduate degrees.

A maximum of 12 credits will be cross-counted towards the B.S. and Masters degrees, from the following courses: B M B 400(2-3), BIOTC 479(3), IBIOS 571(2), IBIOS 591(1), and IBIOS 593(3).

**B.S. Biotechnology Requirements:**
Total credits required: 125  
GENERAL EDUCATION: 46 credits (15 of these are included in the REQUIREMENTS FOR THE MAJOR)  
REQUIREMENTS FOR THE MAJOR: 94-95 credits  
Prescribed courses: 67 credits  
Additional courses: 6-9 credits  
Supporting courses and related areas: 18-21 credits

**Master of Biotechnology Requirements:**
Total credits required: 30 (18 of which must be from 500-level courses)  
Required courses: 16-19 credits  
Electives: 11-14 credits

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[85] To graduate with a B.S. degree in Biotechnology, a grade of C or better is required in two of the following courses: MICRB 201, B M B/MICRB 251, B M B/MICRB 252.

[87] To graduate with a B.S. degree in Biotechnology, a grade of C or better is required in 9 credits of any BIOTC, B M B, or MICRB 400-level course except B M B 442, B M B 443W, B M B 445W, B M B 448, B M B 488, B M B 496, MICRB 421W, MICRB 422, MICRB 447.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-111
Review Date: 08/20/13
UCA Revision #1: 8/3/06

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**Chemical Engineering**

*University Park, College of Engineering (CH E)*

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

**PROFESSOR PHILLIP E. SAVAGE, Head, Department of Chemical Engineering**

Chemical Engineering is one of the most versatile professions—you'll find Chemical Engineers employed in a broad array of industries ranging from pharmaceutical and biotechnical companies to semiconductor manufacturing to start-up companies converting the latest laboratory discoveries to large-scale commercial production. Chemical Engineers work with catalysts to develop new ways to manufacture medicines and plastics; they develop control systems that enable the safe production of products from semiconductors to household soap; they design chemical and petroleum plants; they research the effects of artificial organs on blood flow; and they develop the equipment and processes necessary for advances in biotechnology. While chemistry emphasizes the facts and principles of science, chemical engineering emphasizes its practical application for the development of new products and processes.

The undergraduate program in Chemical Engineering provides students with fundamental skills in problem solving, analysis, and design, along with hands-on experience in practical applications. The curriculum builds upon the traditional foundation in the chemical and energy-related industries and introduces new material in the life sciences, polymers, and environmental fields. Students have numerous opportunities to pursue more specialized areas including formal options in Bioprocess and Biomolecular Engineering, Energy and Fuels, and Polymer Engineering.

The program aims to produce graduates who will attain one or more of the following:

1. Careers as practicing chemical engineers in traditional chemical and energy-related industries as well as in expanding areas of materials, environmental, pharmaceutical, and biotechnology industries.
2. Advanced degrees in chemical engineering (or a related technical discipline), medicine, law, or business.
3. Positions that provide the technical, educational, business, and/or political leadership needed in today's rapidly changing, increasingly technological, global society.

**ENTRANCE TO MAJOR** -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHSY 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

For the B.S. degree in Chemical Engineering, a minimum of 133 credits is required. This baccalaureate program in Chemical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., [www.abet.org](http://www.abet.org).

**Scheduling Recommendation by Semester Standing given like (Sem:1-2)**
GENERAL EDUCATION: 45 credits  
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:  
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 115 credits  
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 97 credits

PRESCRIBED COURSES (87 credits)  
CHEM 110 GN(3) [1], CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), EDSGN 100(3), MATH 140 GQ(4) [1], MATH 141 GQ(4) [1], PHYS 211 GN(4) [1] (Sem: 1-2)  
B M B 251(3), CH E 210(3) [1], CH E 220(3) [1], CH E 230(1), CH E 300(1), CH E 320(3) [1], CH E 330(3) [1], CH E 340(3),  
CH E 350(3) [1], CHEM 210(3), CHEM 212(3), CHEM 213(2), CHEM 457(1-2), MATH 231(2), MATH 251(4), PHYS 212 GN(4) [1], ENGL 202C GWS(3) (Sem: 3-6)  
CHEM 466(3) (Sem: 6)  
CH E 410(3) [1], CH E 430(3) [1], CH E 452(3), CH E 470(3), CH E 480W(3) (Sem: 7-8)

ADDITIONAL COURSES (10 credits)  
Select 1 credit of First-Year Seminar (Sem: 1-2)  
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)  
ECON 102 GS(3), ECON 104 GS(3), or ECON 014 GS(3) (Sem: 1-6)  
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)

REQUIREMENTS FOR THE OPTION: 18 credits

BIOPROCESS AND BIOMOLECULAR ENGINEERING OPTION: 18 credits

PRESCRIBED COURSES (9 credits)  
B M B 442(3), CH E 438(3), CH E 449(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)  
BME 443/MATSE403(3) or BME 444/MATSE 404 IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)  
Select 3-6 credits from departmental list of BPBME Engineering Electives (Sem: 5-8)  
Select 0-3 credits from departmental list of BPBME Science Electives (Sem: 5-8)

ENERGY AND FUELS OPTION: 18 credits

PRESCRIBED COURSES (6 credits)  
EGEE 411W(3), EGEE 455(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)  
F SC 401(3) or ENVSE 400(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)  
Select 9 credits from departmental list of Energy Electives (Sem: 5-8)

GENERAL OPTION: 18 credits

ADDITIONAL COURSES (3 credits)  
MATSE 201(3) or MATSE 202(3) or EGEE 455(3) or BME 443/MATSE 403(3) (Sem: 5-8)

SUPPORTING COURSE ANDS RELATED AREAS (15 credits)  
Select 6 credits in 400-level chemical engineering electives from departmental list (Sem: 5-8)  
Select 3 credits of approved engineering electives from departmental list (Sem: 5-8)  
Select 6 credits of approved professional electives from department list (Sem: 5-8)

POLYMER ENGINEERING OPTION (18 credits)

PRESCRIBED COURSES (12 credits)  
MATSE 202(3), MATSE 441(3), MATSE 446(3), MATSE 447(3) (Sem: 5-8)

ADDITIONAL COURSES (6 credits)  
Select 6 credits from: CH E 443(3), MATSE 403/BME 443(3), MATSE 404/BME 444 IL(3), MATSE 445(3), M E 403(3) (Sem: 5-8)

RESEARCH INTENSIVE OPTION (18 credits)

PRESCRIBED COURSES (6 credits)  
CH E 494(6)

ADDITIONAL COURSES (6 credits)  
Select 3 credits from: CH E 446(3) or CH E 544(3) (Sem: 7-8)  
Select 3 credits from: MATSE 201(3), MATSE 202(3), EGEE 455(3), MATSE 404/BME 444 IL(3), CH E 510(3) [91] (Sem: 5-8)
SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits of approved Research Electives from departmental list (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[31] Students may substitute 6 credits of ROTC for part of this requirement in consultation with department.

[91] "...senior, undergraduate students with an average of at least 3.5, and certain other students with averages of at least 3.00 who have been granted special permission to enroll through the Office of Graduate Enrollment Services."

Penn State University 2003-2004 Graduate Degree Programs Bulletin. Instructor approval is also required.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-077
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UCA Revision #1: 8/3/06
UCA Revision #2: 7/26/07

Chemistry

University Park, Eberly College of Science (CHEM)

PROFESSOR Mark Maroncelli, Assistant Head for Undergraduate Education

This major provides a strong foundation in the theory and practice of chemistry. Mathematics and physics are emphasized, since these subjects are essential to the understanding of chemistry. Courses in English and electives ensure study in non-technical subjects which broaden the student's general education and enables him or her to relate the major to other fields of knowledge.

In order to be eligible for entrance to the Chemistry major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average. 2) Completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), MATH 140 GQ(4), and MATH 141 GQ(4); earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the higher grade will be used in this calculation.)

For the B.S. degree in Chemistry, a minimum of 125 credits is required with a cumulative grade point average of at least a 2.00 in these courses. A grade of C or better is required in all courses within the major field.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR: 1-3 credits

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 94 credits
(This requirement includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

PRESCRIBED COURSES (54 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1)[1], CHEM 112 GN(3)[1], CHEM 113 GN(1)[1], MATH 140 GQ(4)[1], MATH 141 GQ(4)[1](Sem: 1-2)
PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) (Sem: 1-4)
MATH 231(2) (Sem: 3-4)
CHEM 210(3)[1], CHEM 212(3)[1], CHEM 213(2)[1], CHEM 227(4)[1], CHEM 310(3)[1], CHEM 316(1), CHEM 450(3)[1], CHEM 452(3)[1], CHEM 457(2)[1](Sem: 5-6)

ADDITIONAL COURSES (23 credits)
Select 3 credits from MATH 250(3) or STAT 401(3) (Sem: 5-8)
Select 4 credits from advanced laboratory courses[1]: CHEM 423W(4), CHEM 425W (4), CHEM 431W(4), CHEM 459W(4) (Sem: 5-8)
Select 16 credits of chemistry at the 400 level[1]. Up to 6 co-op credits (2 each of SC 295, SC 395, SC 495) may be used in this category. Chemical Research, CHEM 494(1-10) may be used, but the total of CHEM 494 credits plus co-op credits may not exceed 8. (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (17 credits)
These 17 credits may include any courses not on the Chemistry Department list of excluded courses except that CHEM 494 may not be used, and only one credit of each SC 295, SC 395, and SC 495 is allowed in this category. (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2014
CHILDHOOD AND EARLY ADOLESCENT EDUCATION. Students successfully completing this major will have met all of the requirements for the PK-4, ENGLISH EDUCATION 4-8, MATHEMATICS EDUCATION 4-8, or SOCIAL STUDIES EDUCATION 4-8 College Instructional 1 certificate issued by the Pennsylvania Department of Education. Students must apply for admission to the major. Students interested in the major should contact their advisor and enroll in a C 1 295 field experience, which features participation in the classroom.

Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:
1. A minimum cumulative grade point average of 3.00.
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.

Requirements 3-8 must be met by the end of the fourth semester when students typically participate in the Entrance to Major process.

3. A grade of "C" or better in all specified courses.
4. Completion of an early field experience specified by the certification program.
5. Completion of a core of Education courses specified by the certification program.
6. Completion of additional credits as specified by the certification program.
7. Completion of at least 48 semester credit hours, including ENGL 015 GWS(3) or ENGL 030 GWS(3), six credits of quantification, and three credits of natural science, as well as three credits of literature for Early Education PK-4 Option.
8. Approval from the professional education adviser or the head of the pertinent certification program.

For the B.S. degree in Education with an option in Early Education PK-4, a minimum of 127 credits is required; with an option in English 4-8, a minimum of 128 credits is required; with an option in Mathematics Education 4-8, a minimum of 126 credits is required; or with an option in Social Studies Education 4-8, a minimum of 127 credits is required. (See also Teacher Education Programs.)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST YEAR SEMINAR:
(Included in GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 109-115 credits [1]
(This includes 27 credits of General Education courses: Early Education PK-4 Option – 6 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GS courses. English 4-8 Option – 6 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GS courses. Social Studies 4-8 Option – 6 credits of GH courses, 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 64-65 credits

PRESCRIBED COURSES (55 credits)
C I 280 GH(3), EDPSY 014(3), EDTHP 115 US(3), MATH 200 GQ(3) (Sem: 1-4)
C I 495D(12), C I 495F(3), KINES 126(1.5), KINES 127(1.5), LL ED 400(3), LL ED 401(3), LL ED 402(3), MTHED 420(3), SCIED 458(3), SPLLED 400(4), SPLLED 403A(3), SS ED 430W(3) (Sem: 5-8)

ADDITIONAL COURSES (6-7 credits)
STAT 100 GQ(3), STAT 200 GQ(4), or EDPSY 101 GQ(3) (Sem: 1-4)
Any MATH GQ course (Sem: 1-4)

[1] The credit range reflects variability based on the specific courses required by each option within the major.
SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits in literature (GH) (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 45-46 credits

EARLY EDUCATION PK-4 OPTION: (45 credits)

PRESCRIBED COURSES (21 credits)
C I 295A(3), HD FS 229 GS(3) (Sem: 3-4)
A ED 303(3), C I 495A(3), E C E 451(3), E C E 479(3), MUSIC 241(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (24 credits)
Select 3 credits of Economic Geography (GS;US;IL) (Sem: 1-4)
Select 3 credits of US History (GS;US;IL) (Sem: 1-4)
Select 9 credits: 3 credits each (including one course with a lab) from biological science, earth science, and physical science (GN courses) (Sem: 1-6)
Select 6 credits of educational selections from:

ENGLISH EDUCATION 4-8 OPTION: (46 credits)

PRESCRIBED COURSES (19 credits)
C I 295B(3), HD FS 239 GS(3), SOC 119 GS;US(4) (Sem: 1-4)
C I 495B(3), LL ED 412W(3), LL ED 450(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
Select 9 credits: 3 credits each (including one course with a lab) from biological science, earth science, and physical science (GN courses) (Sem: 1-6)
Select 3 credits of British Literature from:
ENGL 221(3), ENGL 222(3), ENGL 440(3), ENGL 441(3), ENGL 442(3), ENGL 443(3), ENGL 444(3), ENGL 445(3), ENGL 446(3), ENGL 447(3), ENGL 448(3), ENGL 449 US;IL(3), ENGL 450(3), ENGL 451(3), ENGL 452(3), ENGL 453(3), ENGL 454(3), ENGL 455(3), ENGL 456(3), ENGL 457(3), or ENGL 458(3) (Sem: 1-6)
Select 3 credits of American Literature from:
ENGL 231 GH(3), ENGL 232 GH(3), ENGL 432(3), ENGL 433(3), ENGL 434(3), ENGL 435(3), ENGL 436(3), ENGL 437(3), ENGL 438(3), or ENGL 439(3) (Sem: 1-6)
Select 3 credits of Comparative Literature from:
Select 3 credits of Writing from:
ENGL 212(3), ENGL 213(3), ENGL 215(3), ENGL 281(3), ENGL 412(3), ENGL 413(3), ENGL 414(3), or ENGL 415(3) (Sem: 1-6)
Select 6 credits of Media Literacy from:

MATHEMATICS EDUCATION 4-8 OPTION: (50 credits)

PRESCRIBED COURSES (35 credits)
C I 295B(3), HD FS 239 GS(3), MATH 140(4), MATH 141(4), MATH 201 GQ(3) (Sem: 1-4)
MATH 311W(3) (Sem: 4-6)
MTHED 428(3), MTHED 429(3) (Sem: 5-6)
MTHED 431(3), MTHED 433(3) (Sem: 6-7)
C I 495B(3) (Sem: 7)

COURSES AND RELATED AREAS (15 credits)
Select 9 credits: 3 credits each (including one course with a lab) from biological science, earth science, and physical science (GN courses) (Sem: 1-6)
Select 3 credits from humanities GH (Sem: 1-3)
Select 3 credits from social and behavioral sciences GS (Sem: 1-3)

SOCIAL STUDIES 4-8 OPTION: (45 credits)

PRESCRIBED COURSES (24 credits)
C I 295B(3), PL SC 001 GS(3), HIST 020 GH;US(3), GEOG 010 GN(3), GEOG 020 GS;US;IL(3), HD FS 239 GS(3) (Sem: 1-6)
C I 495B(3), LL ED 412W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 6 credits: 3 credits each (including one course with a lab) from biological science, and physical science (GN courses) (Sem: 1-6)
Select 15 credits from social sciences with at least 6 credits taken at the 100-level or above
At least 3 credits in Economic Policy Issues (Sem: 3-8)
At least 6 credits in Civics and Society (Sem: 3-8)
At least 6 credits in Historical and Geographical Perspectives (Sem: 3-8)
A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-03-033
Review Date: 11/17/2015
R & T: 01/14/2014

ED

Chinese

University Park, College of the Liberal Arts (CHNS)

PROFESSOR ON-CHO NG, Department Head, Asian Studies

Currently more than a billion people speak Chinese, making it one of the most widely spoken languages in the world. As a rising superpower with an increasingly global impact, China is a major international presence. The major in Chinese is designed to develop skills in speaking, understanding, reading, and writing Chinese, as well as to promote an understanding of the diverse literatures, cultures, and traditions of the Chinese-speaking world, ranging from China itself to Chinese-speaking America. The major can help students prepare for professional careers in which knowledge of Chinese, especially Mandarin, is useful. Students are strongly encouraged to study abroad.

Students planning to teach in public schools should schedule the appropriate courses leading to certification in consultation with an adviser in the College of Education.

For the B.A. degree in Chinese, a minimum of 124 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-9 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 20-28 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in front of Bulletin.)

REQUIREMENTS FOR THE MAJOR: 35 credits[1]
(This includes 0-9 credits of General Education GA, GH, or GS courses.)
(At least 21 credits must be at the 400 level.)
(Students are strongly encouraged to take at least 12 of their credits as part of a study abroad program in a Chinese-speaking location. For curricular sequencing, the program encourages students to pursue this Education Abroad experience in the summer or fall semester of the junior year.

PRESCRIBED COURSES (20 credits)
CHNS 110 IL(4) (Sem: 3-4)
CHNS 401 IL(4), CHNS 402 IL(4) (Sem: 5-6)
CHNS 403W(4), CHNS 404 IL(4) (Sem: 7-8)

ADDITIONAL COURSES (9 credits)
Select 3 credits from CHNS 120 GH;IL(3) or CHNS 121 GH;IL(3) (Sem: 1-6)
Select 3 credits from the CHNS 420-429 level (3) (Sem: 1-8)
Select 3 credits from the CHNS 450-459 level (3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits pertaining to China, such as courses in art history, Asian studies, comparative literature, economics, geography, history, philosophy, political science, religious studies, theatre arts, or other fields, selected from departmental list. (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-03-052
Civil Engineering

University Park, College of Engineering (CE)

PROFESSOR PEGGY JOHNSON, Head, Department of Civil and Environmental Engineering

The program in Civil and Environmental Engineering is designed to provide the basic undergraduate education required for private practice and public service in civil engineering, and/or continue formal education. Emphasis is placed on the fundamentals of civil engineering principles and design techniques. Students utilize basic engineering science concepts in several of the different specialty areas (e.g., construction/management, environmental, materials/pavement design/geotechnical, structures, transportation, and water resources). Finally the students are able to choose an area of specialization for professional practice or graduate studies.

Program Educational Objectives:
The educational objectives of our undergraduate program will prepare our graduates to:

- begin and sustain a career in consulting, industry, or state and federal government agencies, such as the departments of transportation and departments of environmental protection;
- lead and work in interdisciplinary teams needed to design sustainable and resilient infrastructure through knowledge and application of environmental, geotechnical, materials, structural, transportation, and water resources engineering;
- engage in life-long learning opportunities, including graduate school; and
- obtain and maintain professional licensure.

Program Outcomes (Student Outcomes):
The undergraduate program will provide students with:

a. an ability to apply knowledge of mathematics, science, and engineering;
b. an ability to design and conduct experiments, as well as to analyze and interpret data;
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
d. an ability to function on multidisciplinary teams;
e. an ability to identify, formulate, and solve engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively;
h. an understanding of the impact of engineering solutions in a global, economic, environmental, and societal context;
i. a recognition of the need for, and an ability to engage in, life-long learning;
j. knowledge of contemporary issues in civil engineering;
k. an ability to use modern engineering techniques, skills, and tools necessary for engineering practice.

The program is broadened by courses in communication, arts, humanities, social and behavioral sciences, as well as other engineering disciplines. Students gain experience in working as members of a team and using interdisciplinary approaches to solve problems. These experiences, as well as those related to engineering principles and design, are provided through exercises in the classroom, laboratory, and field. The program culmination is a capstone design course wherein the students' knowledge and skills are applied to actual engineering problems.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Civil Engineering, a minimum of 127 credits is required. The baccalaureate program in Civil Engineering at University Park is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)
REQUIREMENTS FOR THE MAJOR: 112 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (71 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), E MCH 211[1], EDSPGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1] (Sem: 1-2)
E MCH 212[1], E MCH 213(3)[1], STAT 401(3), GEOSC 001(3), MATH 220 GQ(2), MATH 251(4)[1], PHYS 212 GN(4)[1] (Sem: 3-4)
C E 310(3)[1], C E 321(3)[1], C E 332(3)[1], C E 335(3)[1], C E 336(3)[1], C E 340(3)[1], C E 360(3)[1], C E 370(3)[1], ENGL 202C GWS(3) (Sem: 5-6)

ADDITIONAL COURSES (29-32 credits)
C E 100S(1) or 1 credit of First-Year Seminar or elective (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPS 200 GQ(3) or CMPS 201 GQ(3) (Sem: 3-4)
ECON 102 GS(3), ECON 104 GS(3), or ECON 014 GS(3) (Sem: 3-4)
M E 201(3) or CH E 220(3)[30] (Sem: 5-6)
Select 3 credits of C E 400 level "W" courses (Sem: 5-8) [1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[30] Students may substitute 6 credits of ROTC for 3 credits of GHA courses and 3 credits of M E.
[+] If C E 475 is taken, one credit goes toward lab requirement and remaining three go towards C E or general technical electives.
[#] Two of those courses must be selected from at least 2 of the 3 remaining technical areas in the Civil Engineering program--structures (x40), hydrosystems (x60), and environmental (x70).

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UCA Revision #2: 7/27/07

SUPPORTING COURSES AND RELATED AREAS: (9 credits)
Select 9 credits of technical elective from C E 300-level courses, C E 400-level courses, or department list. (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[30] Students may substitute 6 credits of ROTC for 3 credits of GHA courses and 3 credits of M E.
[+] If C E 475 is taken, one credit goes toward lab requirement and remaining three go towards C E or general technical electives.
[#] Two of those courses must be selected from at least 2 of the 3 remaining technical areas in the Civil Engineering program--structures (x40), hydrosystems (x60), and environmental (x70).

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Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

Classics and Ancient Mediterranean Studies

University Park, College of the Liberal Arts (CAMS)

PROFESSOR Mark Munn, Head, Department of Classics and Ancient Mediterranean Studies

Classics and Ancient Mediterranean Studies is concerned with the civilizations of the ancient Mediterranean world, including the ancient Greeks, Romans, and the peoples of Egypt and the Near East. The study of these civilizations includes their languages and literatures, history and politics, religion and mythologies, philosophies, and material culture. Students electing the CAMS major follow one of three options. The Ancient Languages Option requires study of Greek or Latin, one or more of the languages of the ancient Near East, or a combination of languages, and is recommended especially for students planning to pursue any classical, Near Eastern, or Egyptian subject in graduate school; planning rabbinic or seminary study; or preparing to teach Latin or Greek at the secondary level. Students in the Language Option are urged to schedule at least one course in historical linguistics or comparative grammar. The Ancient Mediterranean Archaeology (AMA) Option is designed for students interested in the physical evidence for ancient Mediterranean cultures, including the rise and development of settlements and cities; ceramics, metals, stone, and organic remains; and population changes over time. The Classics and Ancient Mediterranean Studies (CAMS) Option is suitable for students interested in a broadly interdisciplinary study of the cultures of the ancient Mediterranean and does not require study of language, although students are encouraged to study the appropriate ancient languages. All students in the major are particularly encouraged to participate in one of the Penn State Education Abroad Programs and/or archaeological field schools in the Mediterranean area. Approved archaeological fieldwork is required for the AMA Option. Up to 15 credits of appropriate education abroad courses may be applied to requirements for the major.

For the B.A. degree in Classics and Ancient Mediterranean Studies, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)
FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 20-24 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 30-34 credits

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 18 credits
No more than 15 credits in courses numbered 099, 199, 299, 399, or 499 may count toward the requirements for the major.

PRESCRIBED COURSES (6 credits)
CAMS 005 GH;IL(3) (Sem: 1-6)
CAMS 400W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits in Greek or Roman literature and language, civilization, or archaeology from approved department list (Sem: 1-8)
Select 3 credits in Near Eastern literature and language, civilization, or archaeology from approved department list (Sem: 1-8)
Select 6 credits, at or above the 100 level, from appropriate offerings in ancient Near Eastern languages and literatures, ancient history, anthropology, art history, classics and ancient Mediterranean studies, Greek, Hebrew, Jewish studies, Latin, linguistics, philosophy, or religious studies from approved department list (Sem: 1-8)

REQUIREMENTS FOR THE OPTION: 12-16 credits

ANCIENT MEDITERRANEAN ARCHAEOLOGY OPTION: (15-16 credits)
Students in this option must complete one season of approved archaeological fieldwork at an ancient Mediterranean or related site. Up to 6 credits of fieldwork may be applied to the COMMON REQUIREMENTS FOR THE MAJOR.

ADDITIONAL COURSES (3 credits)
CAMS 440W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12-13 credits)
Select 6 credits from the following courses: CAMS 492(3), CAMS 493(3), or other 400-level fieldwork course in an approved archaeological project in the Mediterranean region or Near East in consultation with major adviser. (Sem: 5-8)
Select 3 credits from the following course list:
CAMS 090 GH;IL(3) or J ST 090 GH;IL(3) or RL ST 090 GH;IL(3); CAMS 104 GH(3) or HIST 104 GH(3) or RL ST 104 GH;US;IL(3); CAMS 133 GH(3) or J ST 133 GH(3) or RL ST 133 GH(3); CAMS 134 GH;IL(3) or J ST 134 GH;IL(3) or RL ST 134 GH;IL(3); CAMS 140 GH;IL(3), or CAMS 150 GH;IL(3) (Sem: 3-6)
Select 3-4 credits from the following course list:
ANTH 410(4), ANTH 420(3) or J ST 420(3); ANTH 426W(3) or ANTH 428(3) (Sem: 5-8)

ANCIENT LANGUAGES OPTION: (12 credits)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
At least 6 credits must be in one language.
Select 12 credits at the 400 level in either Greek or Latin or in Akkadian, Aramaic, Biblical Hebrew, Egyptian, Hittite, Sumerian, or other ancient Near Eastern language in consultation with major adviser. (Sem: 1-8)

CLASSICAL AND ANCIENT MEDITERRANEAN STUDIES OPTION: (12 credits)

SUPPORTING COURSES AND RELATED AREAS: 12 credits
Select 6 credits at the 400 level from Classics and Ancient Mediterranean Studies (CAMS), ancient Near Eastern languages, Greek, or Latin courses (Sem: 5-8)
Select 6 credits at the 400 level from appropriate courses in ancient Near Eastern languages and literature, ancient history, anthropology, Classics and Ancient Mediterranean Studies, Jewish studies, linguistics, philosophy, or religious studies from approved department list (Sem: 5-8)

Integrated B.S. in Archaeological Science and B.A. in Classics and Ancient Mediterranean Studies/M.A. in Anthropology Degree Requirements
The Department of Anthropology offers an integrated B.A./B.S./M.A. (IUG) program designed to allow academically superior students to obtain a B.A. or B.S. degree in Anthropology, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), and a M.A. degree in Anthropology in five years of study. To complete the program in five years, students interested in the Integrated Undergraduate and Graduate degree in Anthropology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.
During the first three years, the student will follow course scheduling for the B.A. degree in CAMS and either the B.A. degree in Anthropology or the B.S. degree in Archaeological Science (see the Undergraduate Bulletin). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.A. advisors will be
appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected options for their B.A. or B.S. majors, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their thesis research to meet the M.A. thesis requirements. During the fifth year, IUG students take courses fulfilling the M.A. degree requirements and complete their M.A. thesis.

Admission Requirements

Students who wish to complete the Integrated Undergraduate and Graduate Program in Anthropology should apply for admission to both the Graduate School and the IUG Anthropology Program no later than the end of their junior year. Successful students will be admitted formally into the graduate program in Anthropology just prior to their senior year, if their progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all cases, admission to the program will be at the discretion of the joint Anthropology-CAMS admission committee. Criteria for admission include a minimum overall GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis.

Graduate Coursework

REQUIRED COURSES

ANTHROPOLOGY (ANTH)
493. Field Techniques (3)
521. Current Literature in Archaeology (2)
545. Seminar in Anthropology (6)
588. Method and Theory in Archaeology (3)
600. Thesis Research (6)

ADDITIONAL COURSES

Four required credits in ANTH 494(1-12) or CAMS 494(1-12)
Six required credits in CAMS 592(3), 593(3-6), or 596(1-9)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-098
Review Date: 08/20/13

LA

Communication Arts and Sciences

Berks College (CASBL)
University College (CASCC): Penn State Brandywine, Penn State York
University Park, College of the Liberal Arts (CAS)

Contacts: Berks College, Catherine Catanach, cdc18@psu.edu; Penn State Brandywine, Wayne McMullen, wjm11@psu.edu; Penn State York, Deborah Eicher-Catt, dle4@psu.edu; College of the Liberal Arts, Dr. Rachel A. Smith, ras57@psu.edu

This major provides increased understanding and practice in the ways humans use symbols to influence people and the world around them. The ability to communicate effectively with others in personal, social, work and multicultural situations is essential in modern society. A student of Communication Arts and Sciences will learn to think critically, analyze and solve problems, understand and manage conflict, argue persuasively, influence people, form and keep relationships, give effective presentations, and participate in the civic and political life of a community. The flexibility of the program offers preparation for a variety of careers such as administration, law, business, health, and human services fields. A CAS degree also lends itself well to a concurrent degree program in which students prepare themselves in several fields of study.

For the B.A. degree in Communication Arts and Sciences, a minimum of 124 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 25 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
REQUIREMENTS FOR THE MAJOR: 30 credits

PRESCRIBED COURSES (9 credits)
CAS 201 GH(3), CAS 202 GS(3), CAS 204(3) (Sem: 3-6)

ADDITIONAL COURSES (6 credits)
Select 3 credits of skills courses from CAS 203 GS(3), CAS 205(3), CAS 211(3), CAS 213(3), CAS 214W(3), CAS 215(3), CAS 216(2), CAS 250(3), CAS 252(3), CAS 271 US;IL(3), CAS 280W(3), or CAS 283(3) (Sem: 3-8)
Select 3 credits of 300-level courses from CAS 302(2), CAS 311(3), CAS 321(3), CAS 352(3), CAS 373(3), CAS 375(3), CAS 383(3), CAS 398(1-9), CAS 399 IL(1-12) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits of other CAS courses; at least 12 credits must be at the 400 level. A maximum of 6 credits from CAS 494, 495, 496, and 499(IL) may satisfy this requirement. CAS 126(3) and CAS 195(1) may not be counted as part of the major (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010
Blue Sheet Item #: 38-06-118
Review Date: 04/13/2010
LA

Communication Sciences and Disorders

University Park, College of Health and Human Development (CSD)

PROFESSOR CAROL A. MILLER, Interim Head of the Department

This major offers a comprehensive program of study for preparing students who want to become speech-language pathologists or audiologists. The curriculum is specifically designed for the sole purpose of preparing undergraduate students for graduate study in communication sciences and disorders or related areas. This occurs because state licensure laws and professional certifications require that a speech-language pathologist or audiologist must have a master's degree, pass a national test, and complete a clinical fellowship year.

Overall, the curriculum enables students to develop fundamental knowledge based on scientific principles, skills, and attitudes required for habilitating and rehabilitating persons of all ages with a wide range of speech, language, and hearing problems. Further, the curriculum allows students an opportunity to explore all aspects of communication sciences and disorders as well as elect courses of special interest.

The first two years of study emphasize general education and background study. The last two years of study emphasize normal and disordered aspects of speech, language, and hearing as well as professional management, concerns, and obligations. Clinical observation and diversity focused course work are included in the curriculum.

For the B.S. degree in Communication Sciences and Disorders, a minimum of 120 credits is required. (To satisfy graduation requirements, students must have completed 6 credits from courses offered in the college and outside the department in which the major is offered.)

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. CSD requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6-10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 27-30 credits

REQUIREMENTS FOR THE MAJOR: 54-55 credits
(This includes 6-10 credits of General Education courses; 3-6 credits of GS courses; 3-4 credits of GQ courses.)

PRESCRIBED COURSES (42 credits)
CSD 146 US;IL(3)[1], CSD 230(3)[1], CSD 269 US;IL(3)[1], PSYCH 100 GS(3) (Sem: 1-4)
CSD 300 US;IL(3)[1], CSD 301(3) [1], CSD 311(3)[1], CSD 331(3)[1] (Sem: 3-6)
CSD 433(3)[1], CSD 442(3)[1], CSD 444(3)[1], CSD 451(3)[1], CSD 459W(3)[1], CSD 462 US;IL(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (12-13 credits)
Select 3 credits from EDPSY 014(3) or PSYCH 261 GS(3) (Sem: 1-4)
Select 3 credits from HD FS 129 GS(3) or PSYCH 212 GS(3) (Sem: 1-4)
Select 3-4 credits from EDPSY 014(3), PSYCH 261 GS(3), or STAT 200 GQ(4) (Sem: 3-4)
Select 3 credits from HD FS 229 GS(3), HD FS 249 GS(3), HD FS 315 US(3), HD FS 411(3), HD FS 418(3), HD FS 432(3), PSYCH 270(3), or PSYCH 471(3) (Sem: 3-6)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2013
Blue Sheet Item #: 42-03-077
Review Date: 11/19/2013
UCA Revision #1: 8/20/06

HH

Community, Environment, and Development

University Park, College of Agricultural Sciences (CED)

PROFESSOR LELAND GLENN, Program Coordinator

The principal goal of the Community, Environment, and Development (CED) major is to develop the knowledge and skills of undergraduate students to enable them to assist local people, their communities, and institutions effectively understand, respond to and ultimately shape economic and social changes, including those that pose risks to the environment. The CED major focuses on the fields of community and economic development, environment and natural resources, and the critically important interactions between these fields, both locally and globally. Building skills and knowledge to tackle important environment and development issues facing communities today requires a multidisciplinary or transdisciplinary program; the major bridges the disciplines of agricultural, environmental and regional economics on the one hand and rural sociology on the other. Foundation (Level I) courses introduce students to key concepts in economics and sociology, and examine how these disciplines contribute to the basic content knowledge encompassing community and economic development and environmental economics and sociology. Level II courses build on the Foundation courses by extending the content knowledge to address the interrelationship between environment and natural resources and community and economic development. Coursework in Methods, Quantification and Communication is also required, including methods and techniques such as Geographical Information Systems and Geographical Information Analysis, statistics and survey research methods. Finally, students select among three options: (1) Community and Economic Development, (2) Environmental Economics and Policy, and (3) International Development. Students specialize in an option that further allows them to develop skills and competencies matching their specific education and career goals. It is expected that some students completing the program will choose to attend graduate school or law school, while others will choose employment after graduation.

For the B.S. degree in Community, Environment, and Development, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION, or REQUIREMENTS FOR THE MAJOR course selections)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 6-8 credits

REQUIREMENTS FOR THE MAJOR: 88-90 credits
(This includes 21 credits of General Education courses: 6 credits of GQ courses, 6 credits of GS courses, 9 credits of GWS.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 58-60 credits

PRESCRIBED COURSES (40 credits)
CED 152(3)[1], CED 201(3)[1], CED 230(3)[1], ENGL 015 GWS(3) (Sem: 2)
ECON 104 GS(3), GEOG 160 GS(3) (Sem: 3)
CAS 100 GWS(3), CED 309(3)[1], CED 427W(3)[1], STAT 200 GQ(4) (Sem: 4)
CED 417(3) (Sem: 5)
CED 404(3) (Sem: 6)
CED 475(3) (Sem: 8)

ADDITIONAL COURSES (18-20 credits)
AG BM 101 GS(3) or ECON 102 GS(3) (Sem: 1)
R SOC 011 GS;US(3) or SOC 001 GS(3) (Sem: 1)
MATH 022 GS(3) or MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1)
CMPSC 101 GQ(3) or CMPSC 203 GQ(4) (Sem: 3)
REQUIREMENTS FOR THE OPTION: 30 credits

COMMUNITY AND ECONOMIC DEVELOPMENT OPTION (30 credits)

PRESCRIBED COURSES (9 credits)
SOC 023 GS(3) (Sem:5)
AEE 460(3) (Sem:7)
CED 409(3) (Sem: 8)

ADDITIONAL COURSES (9 credits)
CED 430(3) or CEDEV 430(3) (Sem: 5)
CEDEV 452(3) or R SOC 452(3) (Sem:6)
E R M 411(3) or B LAW 425(3) (Sem: 7)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credit in specialization (Sem: 5-8)

ENVIRONMENTAL ECONOMICS AND POLICY (30 credits)

PRESCRIBED COURSES (12 credits)
ECON 302 GS(3) (Sem:5)
CED 431W(3), ECON 428(3) (Sem:7)
CED 429(3) (Sem: 8)

ADDITIONAL COURSES (3 credits)
E R M 411(3) or B LAW 425(3) (Sem:7)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 3 credits of Environmental Science from approved department list.
Select 12 credits in specialization (Sem: 5-8)

INTERNATIONAL DEVELOPMENT OPTION (30 credits)

PRESCRIBED COURSES (18 credits)
SOC 023 GS(3), R SOC 470(3) (Sem: 5)
CED 410(3) (Sem: 6)
CED 425(3), CED 450 IL(3) (Sem: 7)
CED 420 US;IL(3) (Sem: 8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credit in specialization (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 42-01-001
Review Date: 08/20/13

Comments
AG
Publications updated coordinator: 3/1/12

Comparative Literature

University Park, College of the Liberal Arts (CMLIT)

PROFESSOR CAROLINE D. ECKHARDT, Head

Approaching literature with an interdisciplinary and global perspective, the major in Comparative Literature crosses the boundaries of geography, time, nationalities, languages, and cultures. The world of literature taught draws upon readings from the Americas, Europe, Africa, Asia, and the Middle East, and from a wide range of historical periods. The range includes recognized great books along with less-known works, including women's literature, colonial and postcolonial literatures, indigenous literatures, testimonies, legends, myths, and folktales, banned books, literatures of the occult, science and detective fictions, virtual worlds, and cultural theory. Students learn to appreciate different languages and cultures, develop the critical skills for literary and cultural analysis, and relate literature to other media, including film and digital media. The major also encourages students to explore the relationship between literature and ethics through course offerings focused on transnational identities, human rights, cultures of globalization, and the problem of violence. A senior seminar clarifies the mysteries of literary theory and provides opportunities for individual projects.

Students majoring in Comparative Literature take courses in the Department of Comparative Literature and in other literature departments. They also develop competence in a foreign language. Study abroad is encouraged: Students may count up to 18 Education Abroad credits toward the major.

Graduates of the Department of Comparative Literature have undertaken careers in teaching, completed advanced degrees in literature, librarianship, law, and similar fields, entered the Peace Corps or other types of government service, and pursued careers in writing and communications.
The department offers a minor in World Literature as well as the major in Comparative Literature.

For the B.A. degree in Comparative Literature, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 24 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits
(This includes 6 credits of GH General Education courses.)

PRESCRIBED COURSES (9 credits)
CMLIT 010 GH;IL(3), CMLIT 100 GH;IL(3) (Sem: 1-4)
CMLIT 400Y IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
(Must include at least 15 credits at the 400 level)
a. Language: select at least 6 and no more than 18 credits in the study of a single foreign language and/or literature beyond the 12th credit level. See department list. (Sem: 1-8)
b. Literatures: select at least 6 and no more than 18 credits in courses on literature. Up to 12 of these credits can be taken through departments other than Comparative Literature and the department used to fulfill the "Language" requirement in (a) above. Up to 12 credits may be taken as courses offered through an Education Abroad program with departmental approval. (Sem: 1-8)
c. 3 credits in Comparative Literature at the 400 level. (Sem: 4-8)

Integrated B.A./M.A. Program in Comparative Literature (CMLIT)
The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate coursework include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student's selection of primary literatures which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.

Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Comparative Literature B.A. program[1].
2. Must have completed 60 credits of the undergraduate degree program (it is strongly suggested that students apply to the program prior to completing 100 credit(s)).
3. Must be accepted without reservation into the M.A. program in Comparative Literature.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

A typical sequence of coursework for the integrated program would appear as follows:

<table>
<thead>
<tr>
<th>Year One:</th>
<th>6 credits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMLIT 010</td>
<td></td>
</tr>
<tr>
<td>CMLIT 100</td>
<td></td>
</tr>
</tbody>
</table>
### Year Two:
- 6 credits: Foreign Language (beyond the 12-credit level)
- 6 credits: Courses in Literature

### Year Three:
- 9 credits: 400-level courses in Literature, including CMLIT 400Y
- (variable credits) Work in foreign language (credits do not count towards the major, but reading proficiency is required for the M.A. degree)

### Year Four:
- 3 credits: CMLIT 501, 502 and/or 503
- 6 credits: Comparative Literature courses
- 6-9 credits: 500-level courses in Literatures (at least 3 credits in non-Anglophone literature)

### Year Five
- 3 credits: CMLIT 501, 502, and/or 503
- 9-12 credits: 500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
- 6 credits: 500-level Comparative Literature Courses M.A. paper

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[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2010 (CMLIT); Spring Semester 2012 (Integrated B.A./M.A.)

Blue Sheet Item #: 38-05-099 (CMLIT); 40-06-143 (Integrated B.A./M.A.)

Review Date: 04/10/2012

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**Computer Engineering**

*University Park, College of Engineering (CMPEN)*

**PROFESSOR RAJ ACHARYA, Head of the Department of Computer Science and Engineering***

The mission of the faculty of the undergraduate computer engineering program at Penn State is to provide students with the knowledge and experience needed to pursue a productive lifelong career in industry or to engage in further study at the graduate level. Students participate in a balanced program of instruction covering the basic principles of the design and application of computer systems. The program includes coverage in breadth and depth of basic science, engineering, and abstract concepts of information handling. Students specialize in and are prepared for careers in the design, analysis and use of hardware, software and systems. The program is structured to ensure that graduates have a clear understanding of the design and the applications of computers, as well as the ability to apply this knowledge throughout their professional careers.

**Program Educational Objectives:**

In particular, within a few years after graduation, graduates in computer engineering should be able to:

1. Work in industry or government producing or evaluating components of computer hardware and/or software systems.
2. Work in teams to design, implement, and/or maintain components of computer hardware and/or software systems.
3. Stay current through professional conferences, certificate programs, post-baccalaureate degree programs, or other professional educational activities.

**Program Outcomes (Student Outcomes):**

(a) an ability to apply knowledge of mathematics, science, and engineering

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on multidisciplinary teams

(e) an ability to identify, formulate, and solve engineering problems

(f) an understanding of professional and ethical responsibility

(g) an ability to communicate effectively

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHSY 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Computer Engineering, a minimum of 128 credits is required. This baccalaureate program in Computer Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR:
110 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (78 credits)
CHEM 110 GN(3)[1], CMPSC 121 GQ(3)[1], MATH 140 GQ(4), MATH 141 GQ(4)[1], PHYS 211 GN(4)[1], PHYS 212 GN(4)[1] (Sem: 1-2)
CMPSC 122(3)[1], CMPSC 221(3)[1], CMPSC 360(3)[1], CMPSC 362(3), E E 210(4)[1], MATH 220 GQ(2-3), MATH 231(2), MATH 250(3)[1], PHYS 214 GN(2) (Sem: 3-4)
CMPEN 331(3)[1], CMPEN 431(3)[1], CMPSC 311(3)[1], CMPSC 465(3)[1], E E 310(4)[1], E E 353(3)[1], ENGL 202C GWS(3), STAT 418(3) (Sem: 5-6)
CMPEN 482W(3), CMPSC 473(3) (Sem: 7-8)

ADDITIONAL COURSES (26 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPEN 270(4)[1]; or CMPEN 271(3)[1] and CMPEN 275(1) (Sem: 3-4)
ECON 014 GS(3); ECON 102 GS(3), ECON 104 GS(3), or E B F 200 GS(3) (Sem: 3-4)
Select 6 credits from any 400-level CMPEN or CMPSC course (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits from department list (Students may apply up to 3 credits of Co-op. Students who complete ROTC may apply up to 3 credits of ROTC as department list credits and 3 credits of ROTC as GHA credits.)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2012
Blue Sheet Item #: 41-01-036
Review Date: 8/14/2012
R & T: Approved 5/24/2013
UCA Revision #1: 8/3/06
UCA Revision #2: 7/27/07

Computer Science

University Park, College of Engineering (CMPSC)

PROFESSOR RAJ ACHARYA, Head, Department of Computer Science and Engineering

Computer Science is concerned with the analysis, design, and applications of computing software and systems. It includes a core foundation in computer hardware and software with emphasis on the design of efficient, fault-free software. It includes programming languages, data structures, compilers, operating systems, databases, and artificial intelligence.

The major is designed to provide fundamental training in preparing graduates for positions in schools, commerce,
industry, and government. Students should consult their advisers in formulating suitable programs.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CMPSC 122, MATH 140 (GQ), MATH 141 (GQ), MATH 230 (GQ), PHYS 211 (GN), and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Computer Science, a minimum of 126 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(24 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 105-106 credits
(This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (64 credits)
CMPSC 121 GQ(3)[1], CMPSC 122(3)[1], CMPSC 360(3)[1], MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], MATH 220 GQ(2), PHYS 211 GN(4)[1], PHYS 212 GN(4)[1] (Sem: 1-2)
CMPEN 271(3)[1], CMPEN 331(3)[1], CMPSC 221(3)[1], CMPSC 311(3)[1], MATH 230(4)[1], STAT 318(3) (Sem: 3-4)
CMPSC 461(3)[1], CMPSC 464(3), CMPSC 465(3)[1], CMPSC 473(3)[1], ENGL 202C GWS(3), STAT 319(3) (Sem: 5-6)

ADDITIONAL COURSES (19 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
Select 3 credits from any 400-level CMPEN or CMPSC course (Sem: 7-8)
Select 3 credits from CMPSC 431W(3), or CMPSC 483W(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (22-23 credits)
Select 2-3 credits from PHYS 213 GN(2), PHYS 214 GN(2), or 3 credits from the approved list of natural sciences courses (Sem: 3-4)
Select 0-4 credits in a foreign language (second-semester proficiency) (Sem: 5-6)
Select 10-14 credits from department list (Students may apply up to 3 credits of ROTC as department list credits and 3 credits of ROTC as GHA credits) (Sem: 7-8)
Select 6 credits in 400-level non-CMPEN or CMPSC courses in consultation with adviser (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-05-089
Review Date: 02/19/2013
Retention and Transfer: #240 8/20/2013
UCA Revision #2: 7/27/07

Criminology

University Park, College of the Liberal Arts (CRMBA)

PROFESSOR JOHN ICELAND, Head, Department of Sociology, and Crime, Law, and Justice

(The Bachelor of Arts degree in Criminology is offered by the Criminology Program in the Department of Sociology.)

This major provides students with a broadly based liberal education focused on the understanding and analysis of crime and justice systems. Students obtain a foundation of knowledge of the basic components of the criminal justice and legal systems as well as abilities to solve problems, think and read critically, and write effectively within the context of criminal justice and criminological research and theory.

The B.A. degree is suitable for students seeking entry-level positions in the criminal justice system and for students
interested in graduate and law school. Students interested in acquiring strong quantitative skills should consider the B.S. degree.

For the B.A. degree in Criminology, a minimum of 121 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 21 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 34 credits
(This includes 4 credits of General Education GQ courses.)

PRESCRIBED COURSES (13 credits)
CRIM 100 GS(3)/CRIMJ 100 GS(3), CRIM 012 GS(3)/CRIMJ 012 GS(3)/SOC 012 GS(3) (Sem: 1-4)
STAT 200 GQ(4), CRIM 250W(3) (Sem: 1-8)

ADDITIONAL COURSES (21 credits)
Select 3 credits from: CAS 283(3), CMPSC 100(3), CMPSC 101 GQ(3) (Sem: 1-8)
Select 3 credits from: SOC 001 GS(3), SOC 003 GS(3), or SOC 005 GS(3) (Sem: 1-8)
Select 3 additional credits at the 400 level in Criminology (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-06-144
Review Date: 04/10/2012
UCA Revision #2: 7/27/07
LA

Publications updated department head: 12/02/11

Criminology

University Park, College of the Liberal Arts (CRMBS)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

PROFESSOR JOHN ICELAND, Head, Department of Sociology, and Crime, Law, and Justice

This major provides the opportunity to develop a stronger foundation in research methods, quantification, and the sciences. It prepares students with relevant aptitudes for pursuing further studies or finding employment where such knowledge is advantageous. Students contemplating futures in social science research, business, forensics, public service, and paralegal positions should consider this degree or some of its recommended courses.

Either the B.A. or B.S. degree is suitable for students seeking entry level positions in the criminal justice system and for students interested in graduate and law school. Students interested in acquiring strong quantitative skills should consider the B.S. degree.

For the B.S. degree in Criminology, a minimum of 121 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)
GENERAL EDUCATION: 45 credits
(4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 17-19 credits

REQUIREMENTS FOR THE MAJOR: 61-63 credits
(This includes 4 credits of GENERAL EDUCATION GQ courses)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 40 credits

PRESCRIBED COURSES (13 credits)
CRIM 012 GS(3)/CRIMJ 012 GS(3)/SOC 012 GS(3), CRIM 100(3)/CRIMJ 100(3) (Sem: 1-2)
STAT 200 GQ(4) (Sem: 1-8)
CRIMJ 250W(3) (Sem: 2-4)

ADDITIONAL COURSES (27 credits)
Select 3 credits from: CAS 283(3), CMPSC 100(3), CMPSC 101 GQ(3) (Sem: 1-8)
Select 3 credits from: SOC 001 GS(3), SOC 003 GS(3), or SOC 005 GS(3) (Sem: 1-8)
Select 6 credits in race, ethnicity and gender:
Select 6 credits from the core courses CRIMJ 430(3), CRIMJ 432(3), CRIMJ 435(3), CRIM 451(3), CRIM 453(3), CRIM 467(3), CRIM 490(3) (Sem: 5-8)
Select 6 credits from CRIM 406(3), CRIM 407(3), CRIM 413(3), CRIM 414(3), CRIM 421(3), CRIM 422(3), CRIM 423(3), CRIM 424(3), CRIM 425(3), CRM 441(3) (Sem: 5-8)
Select 3 additional credits at the 400-level in Criminology (CRIM) (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 21-23 credits

BUSINESS/PUBLIC ADMINISTRATION OPTION: (21 credits)
PRESCRIBED COURSES (6 credits)
ECON 102 GS(3), ECON 104 GS(3) (Sem: 1-8)

ADDITIONAL COURSES (15 credits)
Select 15 credits with at least 3 credits each from groups a, b, c, d (Sem: 3-8)
a) ECON 302 GS(3), FIN 100(3)
b) MGMT 100(3), MKTG 221(3), PSYCH 281 GS(3), PSYCH 482(3), PSYCH 484(3), PSYCH 485(3)
c) B LAW 243(3), LER 401(3), LER 411(3), LER 434(3), LER 435(3), LER 437(3), SOC 444(3), SOC 455(3)

COMPUTING AND STATISTICS OPTION: (21 credits)
PRESCRIBED COURSES (5 credits)
SOC 470(4), STAT 480(1) (Sem: 5-8)

ADDITIONAL COURSES (16 credits)
Select 16 credits from CAS 483(3), CMPSC 203 QG(4), MATH 110 QG(4) and MATH 111 QG(2) or MATH 140 QG(4) and MATH 141 QG(4); MIS 204(3); STAT 460(3), STAT 462(3) or STAT 464(3) (Sem: 1-8)

LEGAL STUDIES OPTION: (21 credits)
PRESCRIBED COURSES (3 credits)
PHIL 012 GQ(3) (Sem: 1-8)

ADDITIONAL COURSES (18 credits)
Select 3 credits from CAS 213(3), CAS 215(3), CAS 321(3) or CAS 250(3) (Sem: 3-8)
Select 3 credits from HIST 449 US(3), HIST 450 US(3), PL SC 474(3) (Sem: 5-8)

SOCIAL SCIENCE RESEARCH OPTION: (22-23 credits)
PRESCRIBED COURSES (5 credits)
SOC 470(4), STAT 480(1) (Sem: 5-8)

ADDITIONAL COURSES (17-18 credits)
Select 8-9 credits from MATH 110 QG(4) and MATH 111 QG(2) or MATH 140 QG(4) and MATH 141 QG(4), STAT 460(3), STAT 462(3), STAT 464(3) (Sem: 1-8)
Select 9 credits from HD FS 401(3), PL SC 490(3), any 400-level STAT course (Sem: 5-8)

NOTE: Internships will be counted as elective credits (CRIM 395).

NOTE: The following themes should be incorporated into all CRIM classes, as appropriate: ethical issues, ethnicity and gender issues, and theory.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-099
Review Date: 08/20/13
Publications updated department head: 12/02/11
UCA Revision #1: 8/3/06
UCA Revision #2: 7/27/07

Earth Science and Policy

University Park, College of Earth and Mineral Sciences (EARSP)

PROFESSOR PETER J. HEANEY, Associate Head for Undergraduate Programs

Global climate change and environmental change on a more local scale present major challenges for our future. The solution to these problems requires people with a solid scientific understanding of natural earth/environmental systems, and also an understanding of the social, economic, and political dimensions of these problems. This major is intended to bridge the gap between the physical, natural sciences (the earth sciences) and the social sciences, with the understanding that intelligent, effective solutions to environmental problems will require people who grasp the scientific and social dimensions of environmental problems. This major is intended to produce graduates who not only grasp these problems, but who can also apply a wide array of quantitative tools and fundamental principles to generate practical solutions.

Students develop a sense of community through a set of common upper level courses and they gain practical experience through a mandatory internship course. A variety of options are offered to enable greater depth of study in aspects of science and policy related to water and land use, climate change, and energy; a general option is also available.

This major will provide an excellent preparation for careers in environmental law, environmental consulting, and non-profit organizations engaged in the science and policy of environmental issues. This major will also serve as a strong basis for postgraduate studies in environmental science and policy.

WATER AND LAND USE OPTION: This option is intended to develop a focus on the role of water and land in environmental issues, encompassing scientific, economic, and policy dimensions of groundwater and surface water resources and of land use. The Water and Land Use option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the work force.

CLIMATE CHANGE OPTION: This option is intended for students who want to focus on the science and policy related to climate change, including the scientific basis for identifying, understanding, and potentially mitigating climate change. The option also develops a basis for understanding the economic costs and risks related to climate change, as well as the political dimensions. This option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the work force.

ENERGY OPTION: This option is designed to provide a focus on aspects of Earth science and policy related to energy, including the origins of energy and mineral resources, the future of these resources, and the alternatives for meeting future needs. This option also provides a focus on the economics of energy systems and the political dimensions of the challenges related to our energy future. The Energy option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the work force.

GENERAL OPTION: This option is intended for students who desire a broad sampling of Earth science as it relates to policy or those who desire to design their own focus within Earth science in consultation with an academic adviser. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to enter the work force.

For the B.S. degree in Earth Science and Policy, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits (33 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR) (See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR: (Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES: (Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM: (Included in REQUIREMENTS FOR THE MAJOR)
### ELECTIVES: 0-2 credits

**REQUIREMENTS FOR THE MAJOR:** 106-108 credits (This includes 33 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses; 3 credits of GH courses; 6 credits of GS courses.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 79-81 credits

#### PRESCRIBED COURSES (49 credits)

- BIOL 110 GN(4), CHEM 110 GN(3), CHEM 111 GN(1), CHEM 113 GN(1), ECON 102 GS(3), EM SC 100S GWS(3), E B F 111, GEOG 125 GS;US;IL(3), PHIL118 GH(3), PL SC 001 GS(3), STAT 200 GQ(4) (Sem: 1-4)
- EARTH 202(3) [1] (Sem: 6)
- E B F 472(3) [1], GEOG 364(3), GEOSC 450(3) [1] (Sem: 6-8)
- EARTH 400(3), EARTH 495(3) (Sem: 7-8)

#### ADDITIONAL COURSES (30-32 credits)

- ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
- MATH 083 GQ(4) [1] or MATH 110 GQ(4) [1] or MATH 140 GQ(4) [1] (Sem: 1-2)
- GEOSC 001(3) or GEOSC 020 GN(3) (Sem: 1-4)
- MATH 111 GQ(2) or MATH 141 GQ(4) (Sem: 2-3)
- PHYS 211(4) or PHYS 250(4) (Sem: 2-3)
- CAS 100 GWS(3) or ENGL 202C GWS(3) (Sem: 2-5)
- E B F 484(3), GEOG 424 US;IL(3) (Sem: 4-8)

#### REQUIREMENTS FOR THE OPTION: 27 credits

**WATER AND LAND USE OPTION:** (27 credits)

- Select 3 credits from: EARTH 111 GN;US(3), GEOG 160 GS(3), SOILS 101 GN(3) (Sem: 2-5)

**CLIMATE CHANGE OPTION:** (27 credits)

- Select 3 credits from: EARTH 111 GN;US(3), GEOG 160 GN(3), METEO 003 GN(3), METEO 004 GN(3) (Sem: 2-5)
- Select 12 credits from: GEOSC 320(3), GEOSC/METEO 475W(3), METEO 201(3), METEO 466(3) (Sem: 4-8)

**ENERGY OPTION:** (27 credits)

- Select 3 credits from: EARTH 100 GN(3), EGEE 101 GN(3), EGEE 102 GN(3) (Sem: 2-5)
- Select 9 credits from: EGEE 302(3), EGEE 412(3), GEOSC 451(3), GEOSC 454(3), GEOSC 483(3) (Sem: 4-8)
- Select 3 credits from: E B F 484(3), GEOG 424 US;IL(3) (Sem: 4-8)

**GENERAL OPTION:** (27 credits)

- Select 3 credits from: EARTH 002 GN(3), EARTH 100 GN(3), EARTH 111 GN;US(3), EGEE 101 GN(3), EGEE 102 GN(3) (Sem: 2-5)
- Select 9 credits from: EGEF 302(3), EGEF 412(3), GEOSC 451(3), GEOSC 454(3), GEOSC 483(3) (Sem: 4-8)
- Select 3 credits from: E B F 484(3), GEOG 424 US;IL(3) (Sem: 4-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-01-052
Earth Sciences

University College: Penn State DuBois
University Park, College of Earth and Mineral Sciences (EARTH)

PROFESSOR PETER J. HEANEY, Associate Head for Undergraduate Programs

This major provides a comprehensive program in environmental sciences based on a strong emphasis in earth sciences. It is especially directed toward study of the problems that arise from the complex interaction of man's technological and social activities with the natural environment. Graduates are in demand for positions in government, industry, and consulting. Professional activities include gathering and evaluating data on environments; management and coordination of specialized programs in environmental control and modification; and industrial and government planning. Suitable choices of courses may qualify students for graduate work in several fields.

For the B.S. degree in Earth Sciences, a minimum of 123 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 99-101 credits
(This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GWS courses.)

PRESCRIBED COURSES (31 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), EM SC 100S GWS(3)[71], MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-2)
PHYS 211 GN(4), PHYS 212 GN(4) (Sem: 1-4)
BIOL 110(4) (Sem: 3-4)

ADDITIONAL COURSES (36 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
Select 15 credits of introductory earth science from the following list (courses may not double count with minor requirements): EARTH 002 GN(3), EARTH 101 GN(3), EARTH 103 GN(3), EARTH 105 GN(3), METEO 003 GN(3), METEO 022(2), GEOG 030 GS;IL(3), GEOG 110 GN(3), GEOG 111 GN(3), GEOG 115 GN(3), GEOG 160(3), GEOSC 001(3), GEOSC 021 GN(3), SOILS 101 GN(3) (Sem: 1-6)
Select 3 credits of writing-intensive courses from within Earth and Mineral Sciences to include, but not limited to: GEOG 412W(3), GEOG 310W(3), GEOSC 402W(3), GEOSC 470W(3), METEO 471W(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (32-34 credits)
Select 3-4 credits of advanced math, statistics, computer science in consultation with an adviser (Sem: 5-8)
Select 3 credits of field, laboratory experience in consultation with an adviser (Sem: 5-8)
Select 8-9 credits in other approved courses (Students may apply 6 credits of ROTC) (Sem: 5-8)
Select 18 credits[11], in consultation from an adviser, from one of the following Earth and Mineral Sciences interdisciplinary minors:

CLIMATOLOGY
MARINE SCIENCE
WATERSHEDS & WATER RESOURCES
EARTH SYSTEMS
GLOBAL BUSINESS STRATEGIES FOR EARTH AND ENVIRONMENTAL INDUSTRIES

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Summer Session 2000
Blue Sheet Item #: 28-05-017
Review Date: 1/20/04
UCA Revision #1: 8/3/06
Department Head Change: 4/12/05
EM
This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

Students may choose either a Bachelor of Arts or a Bachelor of Science program. An honors program is also offered.

For the B.A. degree in Economics, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Entrance Requirement: To be eligible for entrance into the Economics (ECLBA) major, a degree candidate must satisfy requirements for entrance to the major.

Specific entrance requirements include:

The degree candidate must have completed the following entrance to major requirements with a grade of C or better: ECON 102 and ECON 104.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Include in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Include in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Include in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 15 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

PRESCRIBED COURSES (18 credits)
ECON 102 GS(3), ECON 104 GS(3) (Sem: 3-4)
ECON 106(3), ECON 302 GS(3), ECON 304 GS(3), ECON 306(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 18 credits in Economics 300 or 400 level with department approval, including at least 9 credits at the 400 level (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010
Blue Sheet Item #: 38-06-119
Review Date: 04/13/2010
UCA Revision #: 8/3/06

Economics

University Park, College of the Liberal Arts (ECLBS)
World Campus

PROFESSOR Barry Ickes, Head, Department of Economics

This major is designed for those who seek a broad understanding of the operation of the economic system and training in the methods and uses of economic analysis. Graduates are equipped for employment in many areas of business operations, labor unions, and agencies of government at all levels; and to undertake the graduate work necessary to become professional economists.

The B.S. degree program is intended for students with a strong interest in quantitative skills. An honors program is also
offered.

For the B.S. degree in Economics, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

**Entrance Requirement:** To be eligible for entrance into the Economics (ECLBS) major, a degree candidate must satisfy requirements for entrance to the major.

Specific entrance requirements include:

The degree candidate must have completed the following entrance to major requirements with a grade of C or better: ECON 102 and ECON 104.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**GENERAL EDUCATION:** 45 credits

(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**ELECTIVES:** 26 credits

**REQUIREMENTS FOR THE MAJOR:** 55 credits[1]

(This includes 6 credits of General Education GQ courses.)

**PRESCRIBED COURSES** (18 credits)

ECON 102 GS(3), ECON 104 GS(3) (Sem: 1-2)

ECON 302 GS(3), ECON 304 GS(3) (Sem: 3-4)

ECON 106(3), ECON 306(3) (Sem: 3-6)

**ADDITIONAL COURSES** (7 credits)

MATH 110 GQ(4) or MATH 140 GQ(4); CMPSC 101 GQ(3) or CMPSC 203 GQ(4) (Sem: 1-4)

**SUPPORTING COURSES AND RELATED AREAS** (30 credits)

Select 3 credits in social and behavioral sciences from department list (Sem: 1-8)

Select 6 credits in arts, humanities, social and behavioral sciences from department list (Sem: 1-8)

Select 3 credits in quantification from department list (Sem: 1-8)

Select 18 credits in economics at the 300 or 400 level with department approval, including at least 9 credits at the 400 level (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-120

Review Date: 04/13/2010

LA

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**Education and Public Policy**

*University Park, College of Education (EPP)*

PROFESSOR DANA MITRA, In charge

The Education and Public Policy major (EPP) offers an interdisciplinary program for mission-driven students who want to make a difference in society by building democratic participation and improving civic capacity in and through educational institutions and communities.

The EPP major prepares students to work in political and economic global systems for the betterment of a diverse and democratic society. EPP students become discerning research consumers and policy analysts in order to work for educational reform and social justice. The EPP major blends core courses in educational policy with foundations courses in sociology, political science, economics, business, race and class, and research methods. Elective courses within the major include policy problems, public systems, leadership, ethics, diversity, equality, and equity. In addition to academic studies, the EPP major includes a semester field experience culminating in a real-world, meaningful research project. Opportunities for internships include organizations in State College, Harrisburg, Philadelphia, and Washington, D.C. Graduates of the EPP program will enter professional careers in educational organizations, government, community development, public service, non-profits, consulting, philanthropy, and interest groups.

Baccalaureate degree candidates must have a minimum 2.0 GPA by the end of their fourth semester to be admitted to the Education and Public Policy (EPP) major; thereafter, students must earn a C or better in all prescribed and required courses necessary for the major.

For the B.S. degree in Education and Public Policy, a minimum of 124 credits is required.
Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: (45 credits)
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR. See description of General Education in the Bulletin.)

FIRST-YEAR SEMINAR
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 1-3 credits

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 90-91 credits
(This includes 12 credits of General Education courses: 6 credits of GS courses; 3 credits of GQ courses; and 3 credits of GH courses.)

PRESCRIBED COURSES (39 credits)[1]
PL SC 001 GS(3), PL SC 003 GS;IL(3), ECON 102 GS(3), ECON 104 GS(3), EDTHP 115 US(3), HIST 021 GH;US(3), SOC 005 GS(3) (Sem: 1-4)
CAS 222/CIVCM 211 GS;US(3), EDTHP 200 GS(3), EDTHP 420(3) (Sem: 3-6)
EDTHP 394(3) (Sem: 5-6)
EDTHP 395(3), EDTHP 420(3) (Sem: 7-8)

ADDITIONAL COURSES (9-10 credits)
EDPSY 101 GQ(3), STAT 100 GQ(3)[1], or STAT 200 GQ(4)[1] (Sem: 1-3)
SOC 001 GS(3)[1] or R SOC 011 GS;US(3)[1] (Sem: 1-3)
EDPSY 400(3), EDPSY 406(3), SOC 023 GS(3), SOC 207(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (42 credits)
Select 9 credits of Educational Theory and Policy Studies at the 400 level (Sem: 3-8)
Select 15 credits of Policy Problems and Public Systems from approved department list (Sem: 3-8)[1]
Select 6 credits of Leadership and Citizenship from approved department list (Sem: 3-8)[1]
Select 6 credits of Diversity and Equity from approved department list (Sem: 3-8)[1]
Select 6 credits of Major-related courses in consultation with EDTHP adviser. (Sem: 3-8)

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-038
Review Date: 04/09/2013

ED

Electrical Engineering

University Park, College of Engineering (E E)

PROFESSOR KULTEGIN AYDIN, Head of the Department of Electrical Engineering

Electrical Engineering (E E) is one of the broadest of all engineering majors and is much more than just building electrical circuits. Electrical engineering is the application of electronics, electrical science and technology, and computer systems to the needs of society. An electrical engineer is responsible for designing and integrating electronic/electrical systems in diverse industries such as defense, communications, transportation, manufacturing, health care, construction, and entertainment.

The mission of our undergraduate program is to provide a high-quality education in electrical engineering for our students and to instill in them the attitudes, values, and vision that will prepare them for lifetimes of success, continued learning, and leadership in their chosen careers. A combination of required and elective courses ensures that students acquire a broad knowledge base in electrical circuits, digital systems, electronic devices, electromagnetics, and linear systems, as well as expertise in one or more areas of specialization. Additional problem-solving skills and practical experience are developed through design projects and laboratory assignments, which also provide opportunities for developing team-building and technical communication skills.

Program Educational Objectives:

The BSEE Program provides undergraduates with a broad technical education important for employment in the private or public sector, and it teaches them the fundamentals, current issues, and creative problem solving skills essential for future years of learning. At three to five years after graduation, we foresee our graduates able to accomplish the following:

1. Electrical engineering practice in technical assignments such as design, product development, research, manufacturing, consulting, testing, sales, and management;
2. Participation and leadership on teams comprised of individuals with diverse professional and cultural backgrounds;
3. Continued learning and professional development through such activities as graduate school, distance education, professional training, and membership in professional societies.

Program Outcomes (Student Outcomes):

The BSEE Program Student Outcomes mirror those articulated by ABET:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to engage in lifelong learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHSY 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Admission to the Electrical Engineering major also requires that the applicant have a cumulative GPA of 2.6 or higher by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Electrical Engineering, a minimum of 130 credits is required. This baccalaureate program program in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 112-113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (68 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), EDGSN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1],
PHYS 212 GN(4)[1] (Sem: 1-2)
E E 200(3), E E 210(4)[1], E E 310(4)[1], MATH 220 GQ(2), MATH 230(4), MATH 250(3)[1], PHYS 213 GN(2), PHYS 214
GN(2) (Sem: 3-4)
E E 300W(3), E E 330(4)[1], E E 340(4)[1], E E 350(4)[1], E E 403W(3), ENGL 202C GWS(3) (Sem: 5-6)
E E 403W(3), ENGL 202C GWS(3) (Sem: 7-8)

ADDITIONAL COURSES (20-21 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CMPSC 201 GQ(3) or CMPSC 121 GQ(3) (Sem: 1-2)
CMPEN 270(4)[1], or CMPEN 271(3)[1] and CMPEN 275(1) (Sem: 3-4)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
ECON 102 GS(3) or ECON 104 GS(3) (Sem: 3-4)
Select 3-4 credits from I E 424(3), PHYS 410(3-4), STAT 401(3), STAT 414(3), or STAT 418(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (24 credits)
Select 6 credits from program-approved list of 300-level courses (Sem: 5-6)
Select 3 credits from program-approved list of 300-level or 400-level courses (Sem: 5-6)
Select 6 credits from program-approved list of 400-level courses (Sem: 7-8)
Select 3 credits of engineering/science courses from a program-approved list (Sem: 7-8)
Select 6 additional credits, which may include up to 6 credits of ROTC, up to 6 co-op credits, and others from a program-approved list (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-06-038
EN

PROGRAM CURRENTLY ON HOLD;
NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: September 10, 2010

**Please Note: Individuals interested in earning Pennsylvania teaching credentials for grades PK-8 should refer to the Childhood and Early Adolescent Education major.**

Elementary and Kindergarten Education

Altoona College (EEDAL): Elementary Education Teaching Option
Berks College (EEDBL)

University College: Penn State Lehigh Valley (EEDCC): Elementary Education Teaching Option
University Park, College of Education (EK ED)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

PROFESSOR STEPHANIE SERRIERE, in charge

This major offers teaching options in Early Childhood Education and in Elementary Education. Students successfully completing this major will have met all of the requirements for the N-3 or K-6 College Instructional I certificate issued by the Pennsylvania Department of Education. Students must indicate their choice of teaching option at the time they make application for admission to a teacher education major. Students who are undecided at this time about which teaching option to select should contact their adviser and enroll in a field experience featuring participation in the classroom.

EARLY CHILDHOOD TEACHING OPTION: Students successfully completing this option will have met all of the requirements for the N-3 Instructional I certificate issued by the Pennsylvania Department of Education. Special courses in both human development and education are used to integrate understanding of preschool programs with relevant theories of child development.

ELEMENTARY EDUCATION TEACHING OPTION: Students successfully completing this option will have met all of the requirements for the K-6 Instructional I certificate issued by the Pennsylvania Department of Education.

For the B.S. degree in Elementary and Kindergarten Education, a minimum of 129.5 credits is required for the Early Childhood Teaching Option and a minimum of 122 credits is required for the Elementary Education Teaching Option. (See also Teacher Education Programs.)

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27-30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-3 credits

REQUIREMENTS FOR THE MAJOR: 101-117 credits
(This includes 27-30 credits of General Education courses: 6 credits of GS, 6 credits of GQ, 6 credits of GH, and 9 credits of GN courses for both options. The Early Childhood Teaching option permits 3 credits of GHA.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 84.5-85.5 credits[1]

PRESCRIBED COURSES (57.5 credits)

C I 295(2), EDPSY 014(3), ENGL 100(3), MATH 200 GQ(3) (Sem: 1-4)

ADDITIONAL COURSES (15-16 credits)

EDTHP 115 US(3) or EDTHP 115A GS;US(3) (Sem: 1-3)
HIST 020 GH;US(3) or HIST 021 GH;US(3) (Sem: 1-4)
STAT 100 GQ(3), STAT 200 GQ(4) or EDPSY 101 GQ(3) (Sem: 1-4)
ECON 102 GS(3), ECN 104 GS(3) or ECN 014 GS(3) (Sem: 1-8)
GEOG 020 GS;IL(3), GEOG 030 GS;IL(3), GEOG 126 GS;US;IL(3), GEOG 128 GS;US;IL(3), GEOG 122 GH;US(3), GEOG 123 GS;IL(3), GEOG 120 GS;US;IL(3), GEOG 124 GS;IL(3), or GEOG 128 GS;IL(3) (Sem: 1-8)
SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits in literature GH (Sem: 1-4)
Select 9 credits: 3 credits each (including one course with a lab) from the following GN biological science, earth science and physical science (Sem: 1-6)

REQUIREMENTS FOR THE OPTION: 16.5-30 credits

EARLY CHILDHOOD TEACHING OPTION: (27-30 credits)[1]

PRESCRIBED COURSES (15 credits)

ADDITIONAL COURSES (12-15 credits)
H P A 101(3) or NUTR 251 GHA(3) (Sem: 1-2)
HD FS 315 US(3) or SOC 030 GS(3) (Sem: 1-4)
HD FS 229 GS(3) or PSYCH 100 GS(3) and PSYCH 212 GS(3) (Sem: 1-4)
HD FS 428(3) or HD FS 429(3) (Sem: 5-8)

ELEMENTARY EDUCATION TEACHING OPTION: (16.5-19.5 credits)[1]

PRESCRIBED COURSES (1.5 credit)
KINES 127(1.5) (Sem: 5-8)

ADDITIONAL COURSES (3-6 credits)
HD FS 229 GS(3) or EDPSY 010 GS(3) or PSYCH 100 GS(3) and PSYCH 212 GS(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits in MATH or MTHED (Sem: 1-8)
Select 6 credits from EDTHP at the 400 level, ECE at the 400 level, SPLED at the 400 level, EDLDR 405(3), EDLDR 497(1-9), LL ED 497(1-9) (Sem: 5-8)
Select 3 credits in U.S. History (Sem:1-8)

[1] A grade of C or better per course is required for teacher certification.

Last Revised by the Department: Summer Session 2005
Blue Sheet Item #: 33-06-097
Review Date: 2/12/08
UCA Revision #1: 8/3/06

ED

Energy Business and Finance

University Park, College of Earth and Mineral Sciences (EBF)
University Park, Smeal College of Business

Professor Seth Blumsack, Undergraduate Program Chair

The major in Energy Business and Finance, offered jointly by the College of Earth and Mineral Sciences and the Smeal College of Business, combines training in business, economics, finance, and the physical sciences with a core of courses focusing on energy and related industries. The major helps students prepare for careers in the energy industry, as well as financial institutions, nonprofit groups, and international organizations dealing with energy issues. The curriculum also provides a strong base for further study in business, economics, law, and social sciences.

Entrance Requirement: To be eligible for entrance into the Energy Business and Finance major, a degree candidate must satisfy requirements for entrance to major. Specific entrance requirements include:

1. The degree candidate must have completed more than 27.1 credits of course work.
2. The degree candidate must have a cumulative grade point average of at least 2.0.
3. Complete the following entrance to major requirements: ECON 102 GS(3)[1], MATH 140 GQ(4)[1].

GENERAL OPTION
The General option of the Energy Business and Finance major is appropriate for students who want a broad understanding of the earth and environmental sciences in preparation for careers in industry, commerce, and government.

ENERGY LAND MANAGEMENT OPTION
The Energy Land Management Option in the major of Energy Business and Finance focuses on issues in the acquisition of sub-surface exploration rights. Thus, it is designed to prepare students for a career as a land professional in an energy exploration company. The curriculum, designed in consultation with the American Association of Professional Landmen, requires courses in real estate fundamentals, energy law, geographic information sciences, petroleum engineering and petroleum geology.

Integrated B.S. in Energy Business and Finance (EBF) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Energy Business and Finance undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused EBF undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program
Bulletin for the IUG admission and degree requirements.
(http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

For the B.S. degree in Energy Business and Finance, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

**GENERAL EDUCATION:** 45 credits
(25-27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 0-12 credits

**REQUIREMENTS FOR THE MAJOR:** 90-102 credits
(This includes 25-27 credits of General Education Courses: 4-6 credits of GN courses, 9 credits of GWS courses, 6 credits of GQ courses, and 6 credits of GS courses.

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 66 credits

**PRESCRIBED COURSES** (45 credits)
- MATH 140 GQ(4)\[1\] (Sem: 1)
- ECON 102 GS(3)\[1\] (Sem: 1)
- MATH 141 GQ(4)\[1\] (Sem: 2)
- E B F 200 GS(3)\[1\] (Sem: 3)
- ACCTG 211(4), ECON 104 GS(3), ECON 302 GS(3)\[1\] (Sem: 3-4)
- E B F 301(3)\[1\], E B F 304W(3)\[1\] (Sem: 5-6)
- EME 460(3)\[1\], I B 303 IL(3) (Sem: 5-8)
- R M 302(3)\[1\], E B F 401(3)\[1\] (Sem: 6-8)
- E B F 473(3) (Sem: 7-8)

**ADDITIONAL COURSES** (21 credits)
Select 3 credits from: CAS 100 GWS(3) or EM SC 100S GWS(3) (Sem: 1)
Select 3 credits from: CMPSC 101 GQ(3), CMPSC 200 GQ(3), CMPSC 201 GQ(3), CMPSC 202 GQ(3) (Sem: 1-2)
Select 3 credits from: ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
Select 3 credits from: B A 243(4), B LAW 243(3), or E R M 411(3) (Sem: 3-4)
Select 3 credits from: E B F 472(3)\[1\], STAT 301 GQ(3)\[1\], or STAT 401(3)\[1\] (Sem: 3-4)
Select 3 credits from: E B F 483(3)\[1\] or E B F 484(3)\[1\] (Sem: 7-8)
Select 3 credits from: ENGL 202C GWS(3) or ENGL 202D GWS(3) (Sem: 7-8)

**REQUIREMENTS FOR THE OPTION:** 24-36 credits

**ENERGY LAND MANAGEMENT OPTION** (25 credits)

**PRESCRIBED COURSES** (12 credits)
- GEOSC 001(3)\[1\] (Sem: 1-2)
- GEOG 160 GS(3)\[1\], GEOG 363(3) (Sem: 5-8)
- E B F 402(3) (Sem: 7-8)

**ADDITIONAL COURSES** (13 credits)
Select 4 credits from: PHYS 211 GN(4)\[1\] or PHYS 250 GN(4)\[1\] (Sem: 1-2)
Select 3 credits from: GEOG 361(3)\[1\], GEOG 362(3)\[1\], GEOG 364(3)\[1\], or GEOG 463(3)\[1\] (Sem: 5-6)
Select 3 credits from: E B F 411(3) or GEOG 454(3) (Sem: 7-8)
Select 3 credits from E B F 410(3) or P N G 405(3) (Sem: 7-8)

**GENERAL OPTION:** (24-36 credits)

**ADDITIONAL COURSES** (9-10 credits)

**SUPPORTING COURSES AND RELATED AREAS** (15-26 credits)
Select either:

- Select from one of the following minors: Arabic, Chinese, Civic and Community Engagement, Earth Systems, Energy Engineering, Entrepreneurship and Innovation, Environmental Resource Management, Environmental Systems Engineering, Geographic Information Science, Geosciences, Mathematics, Meteorology, Mining Engineering, Petroleum and Natural Gas Engineering, Russian, Spanish, Statistics, Watersheds and Water Resources or a relevant minor selected in consultation with an adviser;

- Or

- A concurrent major in any subject;
Or
A 15 credit semester-long education abroad program approved by the professor in charge of the E B F major;
Or
A minor in Asian Studies together with an approved E B F summer term abroad experience.

Course Substitutions for the Integrated B.S. in Energy Business and Finance (EBF) and M.S. in Energy and Mineral Engineering (EME)

As many as twelve of the credits required for the master's degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-056
Review Date: 4/14/2015
Minor editorial changes to comply with University editorial style (Publications): 8/23/06

EM

Energy Engineering

University Park, College of Earth and Mineral Sciences (ENENG)

PROFESSOR SARMA V. PISUPATI, Undergraduate Program Chair

The undergraduate program in energy engineering is designed to reflect the growing impact and demand for energy in society and to equip students with the knowledge necessary to achieve the following career and professional goals: become valuable contributors in addressing society’s energy needs and demands; successful leaders in advancing the technology and management of energy; innovators and entrepreneurs in the energy sector; and educators, practicing engineers, and national leaders on energy and associated environmental, health and safety, and policy and economics issues. The program integrates skill sets in the physical sciences (chemistry, engineering, mathematics, and physics) and social sciences (economics, policy, and management) to ensure successful career opportunities and growth within energy-related industries, government agencies, and academia.

The courses are structured to enable students to understand engineering fundamentals and apply the knowledge to solve problems in the production, processing, storage, distribution, and utilization of energy using multiple techniques as synthesis, analysis, design and case studies. Inquiry-based teaching methods and lab experiences are emphasized. The faculty research and scholarly activities are integrated into the curriculum. The program is designed to train students to be lifelong learners, problem solvers, and energy industry leaders. The educational opportunities are sufficiently flexible, broad, and diverse to enable students to tailor their educational experience to particular interests, background, and expected role in society. Flexibility in the curriculum allows other students in energy related programs such as agricultural and biological, chemical, civil, electrical, environmental, mechanical, mining, nuclear, and petroleum engineering, materials science and engineering, industrial health and safety, and energy business and finance to have dual or concurrent degrees, minors, or options (e.g., energy and fuels engineering option in chemical engineering).

The integration of knowledge and skills acquired during the course of study in the Energy Engineering program provides graduates with the following student outcomes:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context
9. A recognition of the need for and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Energy Engineering Program Educational Objectives

Our graduates will be:

1. Employed in the public or private sectors in the areas of energy science, energy engineering or energy business management, or pursuing an advanced degree.
2. Contributing to development of solutions to society’s current energy needs by integrating key science and engineering principles while being adaptable to changing organizational and societal needs;
3. Engaged in individual projects and multi-disciplinary teams designing, evaluating, and recommending methods and strategies for the efficient production, processing and utilization of renewable or non-renewable energy and addressing...
the associated environmental challenges;
4. Effectively communicating with management, coworkers, customers, clients and others in diverse environments;
5. Engaged in life-long learning process to maintain professional competency through training, participation in professional activities and leadership.

Entrance to Major Requirements:
In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Energy Engineering entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140 GQ(4)[1].

Integrated B.S. in Energy Engineering (ENENG) and M.S. in Energy and Mineral Engineering (EME)
The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements.
(http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_em.htm)

For the B.S. in Energy Engineering, a minimum of 131 credits is required. This baccalaureate program in Energy Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

GENERAL EDUCATION: 45 credits
(30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 116 credits
(This includes 30 credits of General Education courses: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (84 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), EM SC 100S GWS(3)[88], MATH 140 GQ(4)[1], MATH 141 GQ(4), PHYS 211 GN(4) (Sem: 1-2)
E E 211(3), MATH 231(2), MATH 251(4), PHIL 103 GH(3), PHYS 212 GN(4) (Sem: 3-4)
EGEE 012(1), EGEE 302(3)[1], EGEE 304(3)[1], EGEE 411(3)[1], EGEE 430(3)[1], EGEE 438(3)[1], EME 301(3)[1], EME 303(3)[1], F SC 431(3), MATSE 201(3) (Sem: 5-6)
ENGL 202C GWS(3), EGEE 437(3)[1], EGEE 441(3)[1], EGEE 451(3)[1], EGEE 464W(3)[1], F SC 432(3) (Sem: 7-8)

ADDITIONAL COURSES (17 credits)
E B F 200 GS(3) or ECON 102 GS(3) or ECON 014 GS(3) (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CHEM 202(3) or CHEM 210(3) (Sem: 3-4)
CMPSC 200 GQ(3) or CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 3-4)
EME 460(3) or I E 302(3) (Sem: 7-8)
EGEE 494(2)[1] or EGEE 295/395/495(2)[1] (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 3 credits of EGEE electives from an approved list in consultation with an adviser.
Select 6 credits of professional courses from an approved list in consultation with an adviser. Other substitutions outside the approved list must be approved by petition.
Select 6 credits of technical electives from a broad list of energy related courses across colleges at Penn State. A list of suggested courses from energy-related departments at Penn State is provided. (Students may apply 6 credits of ROTC to some of the elective choices.) (Sem: 7-8)

Course Substitutions for the Integrated B.S. in Energy Engineering (ENENG) and M.S. in Energy and Mineral Engineering (EME)
As many as twelve of the credits required for the master’s degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[88] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS can be substituted for EM SC 100S GWS.

Lasted Revised by the Department: Summer Session 2014
Blue Sheet Item #: 43-01-025
Engineering Science

University Park, College of Engineering (E SC)

PROFESSOR JUDITH A. TODD, Department Head; P. B. Breneman Chair and Professor of Engineering Science and Mechanics

Engineering Science is a multidisciplinary honors program that emphasizes enhanced understanding and integrated application of engineering, scientific, and mathematical principles. The program is unique because it provides a broad foundation in the sciences and associated mathematics that underlie engineering and provides students the opportunity to obtain a depth of knowledge in an area of their choosing through technical electives and a research and design honors thesis. The curriculum is designed for students who seek to link the engineering disciplines with science. In addition to taking core courses in mathematics, physics and chemistry - (and biology for students in premedicine), students study thermodynamics, heat transfer, electromagnetics, solid and fluid mechanics, electrical devices, materials science, and topics selected as foundational and technical electives. During the junior year, students investigate a variety of research fields and identify a topic for their honor thesis research and design project. During the senior year, all students complete a capstone project on their chosen topic by writing a thesis that applies the scientific principles of research, design and analysis to engineering. Focus areas of study include, but are not limited to: electrical, mechanical, civil, biomedical, and materials engineering and are expected to be interdisciplinary. Hence, Engineering Science students achieve both depth and breadth in engineering and science, are able to function across disciplines, and graduate well prepared for advanced studies as well as professional employment.

The specific program objectives are tied to the mission of the program as described above. They target the major outcomes expected of Engineering Science students and are flexible and readily adaptable to meet changing constituent needs.

Program Educational Objectives

The expected accomplishments of Engineering Science graduates in the first several years following graduation are:

1. participate in lifelong learning activities including, but not limited to, masters, doctorate, medical, and law degrees, continuing education, leadership development, management training, and global involvement/awareness;
2. engage in practice in a wide variety of fields including, but not limited to, electrical systems, electronics, mechanical systems, materials development, forensics, biomaterials, medicine, law, and business;
3. research, develop, design and/or utilize new products, processes, materials, devices, systems, and/or tools;
4. communicate findings and best practices at conferences and meetings, and to the general public through presentations, technical publications (journals, reports, memoranda), and patents;
5. support the needs of the benefit of society;
6. participate in and promote the values of diversity and sustainability in society; and
7. encourage and foster future generations of engineers through mentoring, service, and outreach.

Program Outcomes (Student Outcomes)

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Enrollment is limited to students who have demonstrated that they can benefit from the advanced courses of the curriculum; therefore a minimum grade-point average of 3.0 is required. Qualified students can participate in the integrated undergraduate graduate (IUG) program to streamline the process of earning B.S. and M.S. degrees.

ENTRANCE TO MAJOR -- In addition to the minimum grade-point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*Since Engineering Science is an honors program, admission is limited to students who attain a cumulative GPA of at least 3.0 by the end of the entrance to major semester. In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the non-Honors B.S. degree in Engineering Science, 131 credits and a 2.50 grade-point average are required. The Honors degree requires the same number of total credits but a minimum of 16 honors Jr./Sr. year credits and a higher grade-point average as determined by the faculty. The baccalaureate program in Engineering Science is accredited by the Engineering Accreditation Commission of ABET, Inc. www.abet.org.
GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (65 credits)
CHEM 110 GN(3)\(^1\), CHEM 111 GN(1), EDSGN 100(3), MATH 140 GQ(4)\(^1\), MATH 141 GQ(4)\(^1\), PHYS 211 GN(4)\(^1\)
(Sem: 1-2)
MATH 220 GQ(2-3), MATH 230(4), MATH 251(4)\(^1\), M E 302(4), PHYS 212 GN(4)\(^1\), PHYS 214 GN(2) (Sem: 3-4)
E E 210H(4), E SC 312(3), E SC 407H(3)\(^1\), E SC 409H(1), E SC 414M(3)\(^1\), E SC 433H(1) (Sem: 5-6)
E SC 404H(3)\(^1\), E SC 410H(3), E SC 411H(2), ENGL 202C GWS(3) (Sem: 7-8)

ADDITIONAL COURSES (21 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
E SC 261M(3) or CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), or ECON 014 GS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
E MCH 210H(5)\(^1\) or E MCH 210(5)\(^1\); E MCH 212H(3)\(^1\) or E MCH 212(3)\(^1\) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
Select 15 credits from the department Foundational Elective List (Sem:5-6)
Select 12 credits from the department Technical Elective List (Students may apply 3 credits of ROTC or 3 credits of co-op experience.) (Sem: 7-8)

Integrated Undergraduate/Graduate Study - B.S. Engineering Science - M.S. Engineering Science and Mechanics

The flexibility and strength in fundamentals of the Engineering Science curriculum provides an opportunity for Engineering Science undergraduate students to participate in the ESM Integrated Undergraduate/Graduate (IUG) program. Application for IUG status may be made in the fifth or subsequent semesters.

The IUG program promotes the interchange of ideas across all branches of the scientific and engineering disciplines from both theoretical and experimental perspectives. Students in the composite degree program are expected to pursue interdisciplinary studies in areas that encompass nano- and bionanotechnology, advanced materials, electromagnetic, mechanics, microelectronics, nanoelectronics and bioelectronics, neural engineering, photonics and photovoltaics (among others) and they are expected to embrace multidisciplinary perspectives across departmental, College, and University boundaries.

\[^1\] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2006 (E SC); Spring Semester 2012 (Integrated B.S./E.Sc.-M.S./E.Mch. & Integrated B.S./E.Sc.-M.S./E.Sc. AND Program Description)

Blue Sheet Item #: 42-04-021 (E SC); 33-04-176, 40-05-034 (Add Integrated B.S./E.Sc.-M.S./E.Mch. & Integrated B.S./E.Sc.-M.S./E.Sc.)

Last Revised by the Department: Fall Semester 2013
Review Date: 01/14/2014
R & T: Approved 5/24/2013
UCA Revision #1: 8/3/06
UCA Revision #2: 7/27/07

EN

English

Abington College (ENGAB)
Altoona College (ENGAL)
University College (ENGCC): Penn State Brandywine, Penn State Greater Allegheny, Penn State Wilkes-Barre, Penn State Worthington Scranton, Penn State York
University Park, College of the Liberal Arts (ENGL)

PROFESSOR Mark Morrisson, Department Head

Majors explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and
language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching. English majors often go on to postgraduate study not only in English but in such areas as law, business, education, or other liberal disciplines.

Majors can emphasize writing, literature, or rhetoric, or a mix of literature, writing, and rhetoric. All provide a liberal education and all develop analytic and writing skills. Qualified students may participate in the career internship and in the English honors program.

Students interested in earning certification in secondary education should contact the College of Education, Department of Curriculum and Instruction. (See also Teacher Education Programs.)

For the B.A. degree in English, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR: 4 credits
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES: 12 credits
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM: 12 credits
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in front of Bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

ADDITIONAL COURSES (18 credits)
Select 3 credits from ENGL 200(3) or ENGL 201 GH(3) (Sem: 1-6)
Select 3 credits of a 300/400-level course in each of the following areas:
- Medieval through Sixteenth Century (Sem: 1-8)
- Sixteenth Century through Eighteenth Century (Sem: 1-8)
- The Nineteenth Century (Sem: 1-8)
- Twentieth Century to the Present (Sem: 1-8)
Select 3 credits from ENGL 310H(3) or ENGL 487W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
In consultation with adviser, select 18 credits in literature, writing, or rhetoric (Sem: 1-8)
(At least 9 credits must be at the 300/400 level)
At least 3 of the 300/400 level credits must fulfill a departmental diversity requirement for a course related to race, gender, sexuality, disability, ethnicity, and/or postcolonial issues).

Integrated B.A./M.A. Program in English

The BA in English requires a minimum of 123 credits, with 36 of those credits required for the English major-3 credits of English 200, 3 credits of English 201, 3 credits of English 221, 18 credits of English 300 level or above, 3 credits of pre-1800 300 level or above, 3 credits of post-1800 race, ethnic, or minority literatures 300 level or above, 3 credits of English 487W, senior seminar.

The B.A./M.A. consists of these 36 English credits of the B.A., plus an additional 24 English credits of M.A. work distributed as follows: 12 credits of English 512, 513, or 515. English 512, 513, and 515 can be repeated for credit. In addition, students will take 6 credits of a graduate-level literature and 6 credits of M.A. Master’s paper, 596, to support work on a major project that will be the centerpiece of each student’s culminating Master’s paper. In the Master’s paper, students receiving an M.A. in English with a creative writing concentration will append their Master’s paper with a bibliographic essay referencing primary and/or secondary sources generated by their research for the paper. The essay can discuss the range of research modalities, including contextual background in the work itself as well as contemporary and historic literature that has influenced the style and form of the Master’s paper. Sources consulted for contextual background can include library and database materials, historical research, oral history, interviews, and other bibliographic tools. 12 credits, 6 at the 400 level (412/413/415) and 6 at the 500 level (512/513/515), will be double counted between the B.A. and the M.A. The IUG B.A./M.A. consists of a total of 60 English credits.

A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

Time of Admission to the Program

Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

**Admission Requirements**

Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department's Director of Graduate Studies and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semesters of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English Director of Graduate Studies will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student's creative work and the applicant's plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

A. Support Letters from Faculty and Administrators (addressed to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program)
B. A Personal Statement
C. Portfolio of Creative Work
D. A Plan of Study
E. A transcript and degree audit printed from e-Lion
F. A current resume or curriculum vita
G. A copy of the completed online Graduate School Application (GRE scores are not required).

**Plan of Study and Advising**

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. advisor and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate coursework and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate coursework and 3.6 or higher in English coursework after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the BA in English, graduate with a B.A. in English.

**Sequence of Courses**

The IUG B.A./M.A. consists of a total of 60 English credits. A minimum of 141 credits are required to complete the IUG B.A./M.A. in English.

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-03-103

Review Date: 11/18/2014

Comments

LA

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**Environmental Resource Management**

*University Park, College of Agricultural Sciences (ERM)*

**PROFESSOR ROBERT D. SHANNON, Program Coordinator**

Environmental Resource Management (ERM) is an interdisciplinary, science-based major designed to prepare students to understand and critically analyze environmental problems ranging from local to global in scale, identify solutions, and communicate ideas related to environmental and natural resource issues. The ERM major also focuses on human interactions with the environment by emphasizing the management of environmental resources. The ERM curriculum begins with foundation course work in the biological, physical and social sciences. Later courses apply these principles to the management and sustainability of the environment, and include environmental problem-solving, ecosystem management and environmental law. The third tier, offered through three options, affords considerable flexibility and the opportunity to specialize.

The major prepares students for employment in a variety of environmental positions, including environmental consulting, public agencies, and nonprofit organizations. Students are also prepared for graduate school or law school upon graduation. Realizing the wide range of career possibilities requiring diverse types of academic preparation, three options of study are available: the Environmental Science Option, the Soil Science Option and the Water Science Option.

In the Environmental Science Option, students select a minor or choose a group of courses (totaling at least 18 credits) that focus on a particular aspect of the environment. Examples include watersheds and water resources, climate change
impacts, geographic information systems, energy and air pollution, sustainability leadership, ecology, environmental engineering, wildlife and fisheries science, and others. Courses and minors from across the University can be selected to develop a student's area of specialization in the Environmental Sciences Option.

In the Soil Science Option, students take courses in soil composition and properties, conservation, nutrient management, soil ecology, GIS and mapping. This option also allows the student to choose courses that support their strengths and interests. The option prepares students for positions with private, public, and non-profit firms that evaluate soils for various uses, delineate wetlands, perform environmental assessments, and identify and remediate contaminated soils.

In the Water Science Option, students take courses in hydrologic measurements, wetland conservation, stream restoration, stream and lake ecology, watershed management, and land use practices to control runoff and erosion. The option also prepares students for positions with private, public, and non-profit firms that evaluate water quality and quantity issues, delineate wetlands, perform environmental and hydrological assessments, and identify and remediate contaminated aquatic resources.

For the B.S. degree in Environmental Resource Management, a minimum of 121 credits is required.

*GENERAL EDUCATION: 45 credits*
(27-30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

*FIRST-YEAR SEMINAR: 1-3 credits*

*UNITED STATES CULTURES AND INTERNATIONAL CULTURES:*
(Included in GENERAL EDUCATION course selection)

*WRITING ACROSS THE CURRICULUM:*
(Included in REQUIREMENTS FOR THE MAJOR)

*ELECTIVES: 0-7 credits*

*REQUIREMENTS FOR THE MAJOR: 93-108 credits*
(This includes 27-30 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GS courses; 9 credits of GWS courses.)

*COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 47-48 credits*

*PRESCRIBED COURSES (33 credits)*
CAS 100 GWS(3), ENGL 015 GWS(3), E R M 151(1) [1], CHEM 110 GN(3) [1], CHEM 111 GN(1) [1], CHEM 112 GN(3), CHEM 202(3) (Sem: 1-4)
SOILS 101 GN(3) [1], SOILS 102(1) (Sem: 3-4)
A S M 327(3) [1], ENGL 202C GWS(3), E R M 300(3) [1], E R M 411(3) (Sem: 5-8)

*ADDITIONAL COURSES (14-15 credits)*
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)
AG BM 101 GS(3) or ECON 102 GS(3) (Sem: 1-2)
PHYS 211 GN(4) or PHYS 250 GN(4); STAT 200 GQ(4) or STAT 240 GQ(3) or STAT 250 GQ(3) (Sem: 3-4)

*REQUIREMENTS FOR THE OPTION: 46-60 credits*

*ENVIROMENTAL SCIENCE OPTION: (58-60 credits)*

*PRESCRIBED COURSES (20 credits)*
BIOL 110 GN(4) [1], BIOL 220W GN(4), GEOG 160 GS(3) (Sem: 3-4)
CED 201(3) (Sem: 5-6)
E R M 412(3) [1], E R M 413W(3) [1] (Sem: 7-8)

*ADDITIONAL COURSES (14-16 credits)*
MATH 111 GQ(2) or MATH 141 GQ(4) (Sem: 1-2)
AG BM 200(3) or E R M 402(3) or MGMT 215(3) (Sem: 3-8)
GEOSC 001(3) or GEOSC 303(3) (Sem: 5-6)
Select 6 credits from any 400-level E R M courses (Sem: 7-8)

*SUPPORTING COURSES AND RELATED AREAS (24 credits)*
Select 3 credits in communications/entrepreneurship/leadership (Sem: 3-8)
Select 3 credits in ecology (Sem: 5-6)
Select 18 credits of specialization/minor courses in consultation with adviser (Sem: 5-8)

*SOIL SCIENCE OPTION: (45-46 credits)*

*PRESCRIBED COURSES (12 credits)*
SOILS 403(2), SOILS 422W(3), SOILS 416(4) [1] (Sem: 3-6)
SOILS 450(3) (Sem: 5-8)

*ADDITIONAL COURSES (18-20 credits)*
BIOL 110 GN(4) or BIOL 127 GN(3) (Sem: 1-4)
GEOSC 001(3) or GEOSC 020 GN(3) (Sem: 1-4)
Select 3-4 credits from AGRO 028(3), BIOL 220W GN(4), FOR 203(3), HORT 101 GN(3), TURF 235(3) (Sem: 3-6)
Select 3 credits from E R M 433(3), E R M 440(3), SOILS 402(3), SOILS 419(3), SOILS 420(3) (Sem: 3-8)
Select 3 credits from SOILS 401(3), SOILS 405(3), GEOSC 452(3) (Sem: 3-8)
Select 3 credits from E R M 444(3), FOR 475(3), SOILS 404(3) (Sem: 5-8)

*SUPPORTING COURSES AND RELATED AREAS (18 credits)*
Select 18 credits of supporting courses in consultation with adviser. (Sem: 5-8)
Environmental Systems Engineering

University Park, College of Earth and Mineral Sciences (ENVSE)
PROFESSOR M. THADDEUS ITYOKUMBUL, Undergraduate Program Officer

It is an interdisciplinary program with two options. One option is Environmental Systems Engineering and it is concerned with the impact of industrial activities on the environment and the choice of cost-effective remediation strategies. The other option is Environmental Health and Safety Engineering and it is concerned with safe and healthful design of industrial systems such that workers are protected from potentially high risk exposures associated with today's industries. The program is unique as it is designed to address critical environmental, safety and health problems of the basic industries such as those involved in the extraction, conversion, and utilization of energy and mineral resources. The courses are sequenced so that students acquire an appropriate blend of theory, applications, and design and are equipped with the fundamentals necessary to maintain lifelong professional growth. Graduates are prepared to enter both the private and public sectors as environmental systems engineers or health and safety engineers or to pursue further education at the graduate level.

During the first two years, the program shares many common features (e.g., mathematics, chemistry, physics, and engineering mechanics) with other more traditional engineering disciplines. Students then take a series of special courses that introduce engineering concepts in the extractive and process industries. Process engineering and a variety of solid-solid, solid-fluid, and fluid-fluid separations play a major and often dominant role in the prevention and/or remediation of environmental damage or the prevention of health and safety hazards resulting from industrial activity. Students then specialize in the particular problems associated with air, land, or water, environmental health and safety engineering or select a hybrid program. Specialization is accomplished through a combination of additional designated courses and selection from an extensive list of relevant elective courses, which may include a senior thesis. The curriculum is structured so as to integrate design concepts into the various subject areas covered in the program.

The human, societal, economic, ethical, and regulatory aspects of the industrial impact on the environment and on the workers themselves are addressed through a combination of specific courses and components of other more general courses. This aspect of the program is designed to provide students with a deeper understanding, both of the impact of environmental degradation on society and of the effects on industrial activity of society's demands for protection of workers and the environment. The program culminates with the capstone design course, which is an integrated, problem-based, multi-faceted project in which students, working in a team setting, utilize fundamental concepts to design an environmental remediation system or an environmental health and safety protection system (or incorporate these design requirements into other associated designs).

The integration of knowledge and skills acquired during the course of study in the Environmental Systems Engineering program provides graduates with the following student outcomes:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs
- An ability to function on multi-disciplinary teams
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- An ability to communicate effectively

The broad education necessary to understand the impact of engineering solutions in a global and societal context
A recognition of the need for and an ability to engage in life-long learning

A knowledge of contemporary issues

An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

An ability to integrate knowledge and minimize environmental impacts in resource recovery and the process industries

Environmental Systems Engineering Program Educational Objectives:

Our graduates will

Enter the private or public sectors as environmental systems engineers to solve a broad range of environmental or health and safety problems associated with the resource recovery and general and process industries or pursue an advanced degree.

Address critical environmental or health and safety problems of the basic industries, especially those involved with the extraction, conversion, and utilization of energy and mineral resources; design effective and economic engineering systems to alleviate such problems, individually and in a team setting; and communicate the results effectively.

Determine the impact of environmental pollution control on the viability of industrial operations, including health and safety, social, and ethical aspects, and an awareness of environmental regulations; evaluate novel strategies for minimizing pollution control costs in the process industries.

Recognize the need to maintain professional competency and the value of life-long learning.

Entrance to Major Requirements:

In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Environmental Systems Engineering entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140 GQ(4).

Integrated B.S. in Environmental Systems Engineering (ENVSE) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the environmental systems engineering undergraduate program and the energy and mineral engineering graduate program enables academically superior and research-focused ENVSE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_eme.htm)

For the B.S. in Environmental Systems Engineering, a minimum of 131 credits is required. This baccalaureate program in Environmental Systems Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 113-114 credits
(This includes 27 credits of General Education courses: 9 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 94-95 credits

PRESENTED COURSES (77 credits)

PRESCRIBED COURSES (77 credits)
EM SC 100S GWS(3)[88] (Sem: 1-2)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 202(3), E MCH 211(3), E MCH 212(3), MATH 140 GQ(4)[11], MATH 141 GQ(4), MATH 251(4), PHYS 211 GN(4), PHYS 212 GN(4) (Sem: 1-4)
C E 370(3)[11], EME 301(3)[11], EME 303(3)[11] (Sem: 3-6)
ENGL 202C GWS(3)[11], GEOSC 452(3), MN PR 301(3)[11] (Sem: 5-6)
EME 460(3), ENVSE 404W(3), ENVSE 406(3), ENVSE 427(3)[11], ENVSE 450(3), ENVSE 480(3), MNG 401(1), P N G 411(1) (Sem: 5-8)

ADDITIONAL COURSES (11-12 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CMPSC 201 GQ(3) or CMPSC 202 GQ(3), or CMPSC 203 GQ(4) (Sem: 3-4)
MATH 220 GQ(2) or MATH 231(2) (Sem: 3-4)
GEOG 001(3) or GEOG 071(3) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with adviser (Sem: 7-8) [2]

REQUIREMENTS FOR THE OPTION: 19 credits

ENVIRONMENTAL SYSTEMS ENGINEERING OPTION: (19 credits)

PRESCRIBED COURSES (10 credits)
GEOG 030 GS:IL(3), MICRB 106 GN(3) (Sem: 1-4)
EGEE 470(3), ENVSE 412(1) (Sem: 5-6)

ADDITIONAL COURSES (9 credits)
GEOG 439W(3), SOILS 401(3), or METEO 455(3) (Sem: 7-8)
METEO 454(3), MN PR 425(3), or MN PR 426(3) (Sem: 7-8)
ENVSE 408(3), M E 433(3), or MN PR 401(3) (Sem: 7-8)

ENVIRONMENTAL HEALTH AND SAFETY ENGINEERING OPTION: (19 credits)

PRESCRIBED COURSES (19 credits)
BIOL 141 GN(3), PSYCH 100 GS(3) (Sem: 1-4)
M E 405(3) (Sem: 5-6)
ENVSE 400(3), ENVSE 457(4), ENVSE 470(3) (Sem: 7-8)

Integrated B.S. in Environmental Systems Engineering (ENVSE) and M.S. in Energy and Mineral Engineering (EME) Course Substitutions

As many as twelve of the credits required for the master's degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[2] Students who complete Basic ROTC may substitute 6 credits of ROTC for 3 credits of GHA courses and 3 credits of Supporting Courses and Related Areas.

[88] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2013
Blue Sheet Item #: 42-03-021
Review Date: 11/19/2013
UCA Revision #1: 8/4/06
UCA Revision #2: 7/27/07
EM

Film-Video

University Park, College of Communications (FILM)

PROFESSOR ANTHONY OLORUNNISOLA, Head, Department of Film-Video and Media Studies

The Film-Video major is designed to serve students whose primary interest is the art of film and video practice. It offers an integrated curriculum in which historical, critical, and theoretical studies parallel the teaching of production and aesthetics.

The major serves students who wish to pursue careers in film, television, or related industries, as well as students planning to continue work in film and video at the graduate level.

The major includes a broad liberal arts background with introductory courses in the areas of film and video history, theory, and practice. Students have the flexibility to pursue an area of emphasis at the advanced level (narrative, alternative or documentary production).

Students must select at least 80 credits in courses outside the College of Communications, including at least 65 in the liberal arts and sciences.

Min. Cumulative GPA: 3.0
Credit Window: 40-59 cumulative credits
Courses required with a grade of B or better: COMM 150, COMM 242

Additional criteria:
A candidate who does not meet the minimum GPA or grade requirements may submit a portfolio during finals week of Spring semester as outlined at http://comm.psu.edu/departments/fvms/admission-requirements. Successful portfolio students will be admitted to the major for the following Fall provided any enrollment ceilings of the college or major have not been reached and provided the candidate satisfies the minimum academic requirement of at least a C (2.00) cumulative average for all courses taken at the University subject to the conditions of Section 51-50. Applicants who are not accepted into the major may re-apply the following year but must realize that this course of action could delay their graduation by at least one year.
For the B.A. degree in Film-Video, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12
credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 33 credits

PRESCRIBED COURSES (15 credits)
COMM 150 GA(3) (Sem: 1-2)
COMM 242(3), (Sem: 2-4)
COMM 340(3), COMM 342W(3) (Sem: 5-6)
COMM 250(3) (Sem: 5-8)

ADDITIONAL COURSES (18 credits)
Select 6 credits from COMM 337(3), COMM 338(3), COMM 339(3) (Sem: 5-6) *
Select 3 credits from COMM 437(3)*, COMM 438(3)*, COMM 439(3)*, COMM 448(3)** (Sem: 7-8)
Select 9 credits from COMM 346(3), COMM 437(3)*, COMM 438(3)*, COMM 439(3)*, COMM 440(3), COMM 443(3), COMM 444(3), COMM 445(3), COMM 446(3), COMM 449(3) (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
Neither COMM 437, COMM 438, nor COMM 448 may be taken concurrently.
** Admittance to COMM 448 is by permission of instructor.

Last Revised by the Department: Spring Semester 2016
Blue Sheet Item #: 44-06-033B
Review Date: 04/5/2016
Department head update by Publications: 1/16/07
Publications 02/17/05
CM

Finance

University Park, Smeal College of Business (FIN)

PROFESSOR WILLIAM A. KRACAW, Chair of the Department of Finance

This major provides students with an opportunity to study investment analysis, management of banks and other
financial institutions, and financial management of corporations and other businesses. Course coverage includes
business finance, security markets, commercial bank management, investment valuations, portfolio management,
futures and options markets, and capital budgeting.

Entrance Requirement: To be eligible for entrance into the Finance (FIN) major, a degree candidate must be enrolled in
the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the
   bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4)[11]; ECON 102 GS(3); SCM 200 GQ(4)[11] or
   STAT 200 GQ(4)[11]; ENGL 015 GWS(3) or ENGL 030 GWS(3); and MATH 110 GQ(4)[11] or MATH 140 GQ(4)[11]; FIN
   301(3)[11]; MGMT 301(3)[11]; and MKTG 301(3)[11]. These courses must be completed by the end of the semester
during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve
   administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal
   College of Business. In each case, however, academic requirements are established for admission. For information

For the B.S. degree in Finance, a minimum of 120 credits is required with at least 15 credits at the 400 level.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 14 credits

REQUIREMENTS FOR THE MAJOR: 73 credits
(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.)

PRESCRIBED COURSES (46 credits)
ACCTG 211(4), ECON 102 GS(3), FIN 301(3)\[1\], MGMT 301(3)\[1\], and MKTG 301(3)\[1\]; and B A 342(3), B A 411(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), FIN 305W(3)\[1\], FIN 406(3)\[1\], FIN 408(3)\[1\], MIS 204(3), SCM 301(3), (Sem: 1-4)

ADDITIONAL COURSES (14 credits)
MATH 110 GQ(4)\[1\] or MATH 140 GQ(4)\[1\] (Sem: 1-2)
SCM 200 GQ(4)\[1\] or STAT 200 GQ(4)\[1\] (Sem: 1-2)
Select 6 credits\[1\] from FIN 405(3), FIN 407(3), FIN 410(3), FIN 414(3), FIN 460(3) or M 460(3), FIN 470(3) or M 470(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (13 credits)
Select 4 credits: Attainment of 12th credit level proficiency in a single foreign language. (4 credits) Proficiency must be demonstrated by either examination or course work. (Sem: 1-4)
Select 3 credits of related coursework. See Department List. (Sem: 5-8)
Select 6 credits of supporting coursework. See Department List. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010
Blue Sheet Item #: 38-06-040
Review Date: 04/13/2010
UCA Revision #1: 8/4/06

BA

Food Science

University Park, College of Agricultural Sciences (FD SC)
PROFESSOR SARA R. MILILLO, Program Coordinator

Food science involves the application of science and technology to food product manufacture, storage, and distribution to consumers. Food scientists are especially concerned with food safety, nutritional values, managing food quality, food plant management, and development of new products and processes. They are employed by manufacturers and distributors of food products; by chemical, packaging, and other industries that supply goods and services; by colleges and universities in teaching and research; and by government agencies concerned with food regulations and the health and well-being of the general public.

For the B.S. degree in Food Science, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(19 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 2 credits

REQUIREMENTS FOR THE MAJOR: 92 credits
(This includes 19 credits of General Education courses: 9 credits of GN courses; 7 credits of GQ courses; 3 credits of GWS courses.)
PRESCRIBED COURSES (65 credits)
BIOL 110 GN(4), B M B 211(3), B M B 212(1), CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3)\[1\], CHEM 113 GN(1),
FD SC 200(3)\[1\], FD SC 201(1)\[1\], FD SC 400(4), FD SC 405(3)\[1\], FD SC 406(3), FD SC 408(3), FD SC 409W(2 ), FD SC
250 GN(4), STAT 250 GQ(3) (Sem: 5-6)

ADDITIONAL COURSES (13-15 credits)
CHEM 202(3)\[1\], CHEM 203(3); or CHEM 210(3)\[18\], CHEM 212(3), CHEM 213(2)
ENGL 202C GWS(3) or ENGL 202D GWS(3)
MATH 110 GQ(4) or MATH 140 GQ(4)

SUPPORTING COURSES AND RELATED AREAS (12-14 credits)
To reflect the student's career interests, select 12-14 credits (depending on the organic chem series that they took, a
total of 6 credits or 8 credits) from department list or in consultation with adviser (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-02-004
Review Date: 10/13/2015
01/19/00 (General Education information updated)
UCA Revision #1: 8/4/06
AG
PROGRAM COORDINATOR UPDATED: 9/2/14

Forensic Science

University Park, The Eberly College of Science (FRNSC)

Forensic Science is the application of scientific principles and methods to assist criminal and civil investigations and
litigation. This major is an inter-college collaboration among academic units and provides students with a strong
foundation in the biological, physical, and mathematical sciences. It introduces them to relevant topics in criminalistics
forensic chemistry, forensic biology, crime scene investigation, and appropriate social sciences. Students are educated
on the role of forensic scientists in the criminal justice system, the collection and analysis of scientific evidence, and the
manner in which evidence is presented in court. Graduates of this major could pursue employment as a scientist in a
federal, state, or private forensic laboratory or with insurance companies, homeland security agencies, or the judicial
community. Graduates could also choose to pursue advanced degrees, for example, in forensic science, medicine,
psychology, anthropology, pathology, odontology, entomology, toxicology, law, or in the general sciences.

In order to be eligible for entrance to the Forensic Science major, a student must have: (1) attained at least a 2.00
cumulative grade point average (2) completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), FRNSC 210(3),
MATH 140 GQ(4), and earned a grade of C or better in each of these courses.

For the B.S in Forensic Science a minimum of 124-126 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin)

FIRST YEAR SEMINAR:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 97-99 credits
(This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GH
courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 63 credits

PRESCRIBED COURSES: (52 credits)\[1\]
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), CHEM 212(3), CHEM 213(2), MATH
140 GQ(4), MATH 141 GQ(4) (Sem: 1-4)
PHIL 132 GH(3) (Sem: 1-8)
FRNSC 100(3) (Sem: 2)
FRNSC 210(3) (Sem: 3)
FRNSC 410(2) (Sem: 4-6)
FRNSC 415W(2) (Sem: 5-6)
FRNSC 411(3), FRNSC 413(3) (Sem: 5-7)
STAT 250 GQ(3) (Sem: 5-8)
FRNSC 400(1), FRNSC 475(1), FRNSC 485W(4) (Sem: 7-8)

ADDITIONAL COURSES: (11 credits)\[1\]
CRIM 100 GS(3) or CRIM 113 US(3) (Sem: 1-6)
PHYS 250 GN(4), PHYS 251 GN(4); or PHYS 211 GN(4), PHYS 212 GN(4) (Sem: 2-6)

REQUIREMENTS FOR THE OPTION: 34-36 credits

FORENSIC BIOLOGY OPTION: (36 credits)

PRESCRIBED COURSES: (21 credits)[1]
B M B 251(3), MICRB 201(3), MICRB 202(2) (Sem: 1-4)
B M B 400(3), B M B 401(3), B M B 442(3) (Sem: 5-7)
FRNSC 421W(4) (Sem: 7-8)

ADDITIONAL COURSES: (9 credits)[1]
BIOL 222(3) or BIOL 322(3) (Sem: 3-5)
Select 6 credits from B M B 402(3), B M B 428(3), B M B 433(3), BIOL 405(3), BIOL 422(3), BIOL 460(3) (Sem: 6-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with adviser (Sem: 3-8)

FORENSIC CHEMISTRY OPTION: (34 credits)

PRESCRIBED COURSES: (19 credits)[1]
BIOL 110 GN(4), BIOL 230W GN(4) (Sem: 1-4)
CHEM 227(4) (Sem: 3-5)
CHEM 425(3) (Sem: 5-7)
FRNSC 427W(4) (Sem: 6-8)

ADDITIONAL COURSES: (9 credits)[1]
Select 9 credits from B M B 428(3), CHEM 410(3), CHEM 412(3), CHEM 423W(4), CHEM 430(3), CHEM 431W(4), CHEM 450(3), CHEM 452(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with adviser (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-02-066
Review Date: 10/7/2014
UCA Revision #1: 8/4/06
UCA Revision #2: 7/27/07

Forest Ecosystem Management

University Park, College of Agricultural Sciences (FOREM)

PROFESSOR ELLEN MANNO, Program Coordinator

The mission of the B.S. program in Forest Ecosystem Management is to help students develop the knowledge, skills, and professional ethics for understanding and managing forest ecosystems and living as responsible members of society.

The Forest Ecosystem Management major provides for the education necessary for students to pursue professional careers in one of the following options: (1) Forest Biology, (2) Forest Management, (3) Community and Urban Forest Management, and (4) Watershed Management. These options also will prepare students for graduate studies in continuing professional education.

FOREST BIOLOGY OPTION: This option provides a strong background in the biological and ecological aspects of contemporary forestry and establishes a sound foundation for professional employment and graduate-level study in forestry, ecology, and related disciplines.

FOREST MANAGEMENT OPTION: This option provides professional training in the management of forest lands consistent with the needs of ownership objectives. Employment opportunities include forest management positions with public agencies, industry, and private consulting.

COMMUNITY AND URBAN FOREST MANAGEMENT OPTION: This option helps prepare students to manage community trees and green spaces. It emphasizes technical expertise, communication abilities, and skills for working with diverse people. Employment opportunities include municipalities, arboricultural companies, utilities, and government agencies.

WATERSHED MANAGEMENT OPTION: This option focuses on water resources and the integrated management of natural resources with emphasis on water. Graduates qualify for federal employment as hydrologists and for water-related careers in municipal watershed management, state and local government, and environmental/engineering consulting.

For the B.S. degree in Forest Ecosystem Management, a minimum of 120 credits is required for the Forest Biology, Forest Management, and Watershed Management options, and a minimum of 123 credits for the Community and Urban Forest Management option. Students should be aware that, in most cases, completion of the Forest Ecosystem Management degree in four years requires enrollment at the University Park Campus beginning the fall semester of the sophomore year.
GENERAL EDUCATION: 45 credits
(21-27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-10 credits

REQUIREMENTS FOR THE MAJOR: 90-102 credits
(This includes 21-27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3-6 credits of GS courses; 0-3 credits of GA courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 35-36 credits

PRESCRIBED COURSES (29 credits)
CHEM 110 GN(3), CHEM 111 GN(1), ECON 102 GS(3) (Sem: 1-2)
FOR 200(1), FOR 203(3), FOR 255(3), FOR 266(4), SOILS 101 GN(3) (Sem: 3-4)
FOR 308(3) (Sem: 5-6)
FOR 400(2), FOR 421(3) (Sem: 7-8)

ADDITIONAL COURSES (6-7 credits)
STAT 200 GQ(4), STAT 240 GQ(3), or STAT 250 GQ(3) (Sem: 1-2)
ENGL 202C GWS(3) or ENGL 202D GWS(3) (Sem: 5-6)

REQUIREMENTS FOR THE OPTION: 55-66 credits

FOREST BIOLOGY OPTION: (57-58 credits)

PRESCRIBED COURSES (34 credits)
BIOL 110 GN(4), BIOL 220W GN(4) (Sem: 1-2)
CHEM 202(3) (Sem: 3-4)
FOR 204(2), FOR 350(3), FOR 409(2), SOILS 102(1) (Sem: 3-6)
FOR 410(3), FOR 430(3), HORT 445(3), W FS 209(3) (Sem: 5-8)

ADDITIONAL COURSES (8-9 credits)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)
Select 4-5 credits from ENT 313(2), FOR 403(3), PPEM 318(2) (Sem: 4-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits from department list in consultation with adviser (Sem: 5-8)

FOREST MANAGEMENT OPTION: (56-60 credits)

PRESCRIBED COURSES (32 credits)
FOR 204(2), FOR 320(2), FOR 350(3), ENT 313(2), PPEM 318(2), WFS 209 GN(3) (Sem: 5-6)
FOR/WFS 430(3), FOR 440(3), FOR 455(3), FOR 466W(3), FOR 470(3), FOR 480(3) (Sem: 5-8)

ADDITIONAL COURSES (12-16 credits)
BIOL 110 GN(4) or BIOL 127 GN(3) (Sem: 1-2)
MATH 022 GQ(3), or MATH 026 GQ(3); or MATH 040 GQ(5); or MATH 041 GQ(3); or MATH 110 GQ(4); or
MATH 140 GQ(4) (Sem: 1-2)
FOR 409(2) and SOILS 102(1) or FOR 475(3) (Sem: 3-8)
FOR 401(3) or FOR 450(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
In consultation with adviser, select 12 credits from department list approved for the option. Six credits must be 300-to 400-level. (Sem: 5-8)

COMMUNITY AND URBAN FOREST MANAGEMENT OPTION: (61-66 credits)

PRESCRIBED COURSES (32 credits)
A S M 217(3), ENT 313(2), ENT 314(1), FOR 204(2), PPEM 318(2) (Sem: 3-6)
FOR 401(3), FOR 450(3), FOR 480(3), GEOF 430(3), HORT 138(3), HORT 301(3), HORT 408(4) (Sem: 5-8)

ADDITIONAL COURSES (21-25 credits)
BIOL 110 GN(4) or BIOL 127 GN(3) (Sem: 1-2)
MATH 022 GQ(3), or MATH 026 GQ(3); or MATH 040 GQ(5); or MATH 041 GQ(3); or MATH 110 GQ(4); or
MATH 140 GQ(4) (Sem: 1-2)
ARCH 316 GA(3) or LARCH 060 GA(3) or LARCH 065 GA(3) (Sem: 3-4)
FOR 409(2) and SOILS 102(1) or FOR 475(3) (Sem: 3-8)
FOR 495(3) or FOR 496(3) (Sem: 5-6)
RPTM 320(3) or RPTM 325(3) or RPTM 435(3) or RPTM 470(3) (Sem: 5-6)
FOR 455(3) or GEOG 363(3) or SOILS 450(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (8-9 credits)
Select 8-9 credits from department list In consultation with adviser (Sem: 5-8)
WATERSHED MANAGEMENT OPTION: (55-59 credits)

PRESCRIBED COURSES (7 credits)
FOR 450W(3), FOR 470(3), FOR 471(1) (Sem: 6-8)

ADDITIONAL COURSES (9-11 credits)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)
MATH 111 GQ(2) or MATH 141 GQ(4) (Sem: 3-4)
FOR 409(2) and SOILS 102(1); or FOR 475(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (39-41 credits)
Select 6 credits of GS social sciences from E B F 200 GS(3), ECON 302 GS(3), EGEE 211 GS(3), ENVST 100 GS(3), GEOG 020 GS(3), GEOG 030 GS(3), GEOG 130 GS(3), GEOG 160 GS(30, PL SC 001 GS(3), PL SC 135 GS(3) (Sem: 1-5)
Select 6 credits of physical sciences from EARTH 100 GN(3), EARTH 103 GN(3), EARTH 111 GN(3), GEOG 101 GN(3), GEOG 110 GN(3), GEOG 001(3), GEOG 010 GN(3), GEOG 040 GN(3), GEOSC 040 GN(3), METEO 003 GN(3), METEO 122 GN(3), MICRB 106 GN(3), SOILS 450(3) (Sem: 1-5)
Select 6-8 credits of GN from PHYS 001 GN(3), PHYS 150 GN(3), PHYS 151 GN(3), PHYS 211 GN(4), PHYS 213 GN(2), PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 3-4)
Select 3 credits in geospatial analysis from FOR 455(3), GEOG 362(3), GEOG 363(3), GEOG 364(3) or SOILS 450(3) (Sem: 5-8)
Select 3 additional credits at the 300-to 400-level from the lists above (Sem:7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-06-002
Review Date: 04/09/2013
UCA Revision #1: 8/4/06

French and Francophone Studies

University Park, College of the Liberal Arts (FR BA)
PROFESSOR BENEDICTE MONICAT, Head

The B.A. major in French and Francophone Studies encourages students to develop fluency in the language as well as an appreciation of francophone literature and culture. The major can also help to prepare students for interdisciplinary professional careers in which a knowledge of a foreign language is useful. At present, the B.A. major in French and Francophone Studies is available either as a Language and Culture option or as a Language and Literature option.

For the B.A. degree in French, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of coursework in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 18 credits

PRESCRIBED COURSES (18 credits)
FR 201 IL(3), FR 202 IL(3), FR 331 IL(3), FR 332(3), FR 351 IL(3), FR 352 IL(3) (Sem: 1-6)
REQUIREMENTS FOR THE OPTION: 18 credits

LANGUAGE AND CULTURE OPTION: (18 credits)

PRESCRIBED COURSES (9 credits)
FR 316(3) or FR 417 IL(3) or FR 418 IL(3) or FR 419 IL(3), and FR 402Y IL(3), FR 430 IL(3) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)
Select 9 credits in French literature at the 400 level (Sem: 5-8)

LANGUAGE AND LITERATURE OPTION: (18 credits)

ADDITIONAL COURSES (18 credits)
FR 316(3) or FR 417 IL(3) or FR 418 IL(3) or FR 419 IL(3) (Sem: 5-8)
Select 15 credits in French literature at the 400 level (Sem: 5-8)

LANGUAGE AND LINGUISTICS OPTION: (18 credits)

PRESCRIBED COURSES (15 credits)
FR 316(3), FR 402Y IL(3), FR 417(3), FR 418(3), FR 419(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)
LING 402, LING 404 or LING 449 (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2011
Blue Sheet Item #: 39-05-117
Review Date: 02/22/2011
LA

French and Francophone Studies

University Park, College of the Liberal Arts (FR BS)

PROFESSOR BENEDICTE MONICAT, Head

The B.S. degree is designed to allow students to combine fluency in French with other academic disciplines. The Business option develops basic skills in French (speaking, understanding, reading, writing) and acquaints students with a number of fields essential to business, especially in the international area. The Engineering option has a required overseas study or work component. The Applied French option develops basic skills in French (speaking, understanding, reading, writing) as well as a basic knowledge of French literature and culture. At the same time, it provides a concentration in a professional area in which a command of French can be particularly relevant or useful. Courses in French culture and civilization are essential to all B.S. options, and students are encouraged to participate in the University’s International Studies programs in France.

For the B.S. degree in French and Francophone Studies (all options) a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(9-16 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 17-21 credits

REQUIREMENTS FOR THE MAJOR: 54-71 credits[1]
(This includes 9-16 credits of General Education courses. For the French-Business Option, 0-4 credits of GQ courses; 6-9 credits of GS courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 24 credits

PRESCRIBED COURSES (21 credits)
FR 201 IL(3), FR 202 IL(3), FR 331(3), FR 351 IL(3), FR 352 IL(3) (Sem: 1-6)
FR 401 IL(3), FR 402Y IL(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)
FR 316(3) or FR 417 IL(3) or FR 418 IL(3) (Sem: 1-6)

REQUIREMENTS FOR THE OPTION: 30-47 credits

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
FRENCH-BUSINESS OPTION: (47 credits)

PRESCRIBED COURSES (31 credits)
FR 407 IL(3) (Sem: 1-2)
ACCTG 211(4), B A 301(3), B A 303(3) B A 304(3), ECON 102 GS(3), ECON 104 GS(3), ENGL 202D GWS(3), FR 430 IL(3), I B 303 IL(3) (Sem: 1-4)

ADDITIONAL COURSES (10 credits)
Select 4 credits from: SCM 200(4) or STAT 200 GQ(4) (Sem: 3-4)
Select 3 credits from: ECON 333 GS(3) or MKTG 445 IL(3), or MGMT 461(3) (Sem: 5-8)
Select 3 credits from: MKTG 220(3) or I B 403(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 3 credits in French literature (Sem: 5-8)
Select 3 credits in French at the 400 level (Sem: 5-8)

FRENCH-ENGINEERING OPTION: (33 credits)
(Open only to students enrolled in an engineering major.)

PRESCRIBED COURSES (6 credits)
FR 409 IL(3), FR 430 IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
Select 21 credits of engineering courses, including ENGR 295(1-3) and ENGR 395(1-3), in consultation with the engineering adviser (Sem: 3-8)
Select 6 credits in French at the 400 level (Sem: 5-8)

Note: All French-Engineering majors are required to participate in a one-semester engineering internship in France, arranged by the College of Engineering, during which up to 9 credits in French and up to 12 credits in engineering may be earned. The work experience may take the form of a professional internship (ENGR 195I) or be part of a cooperative education sequence (ENGR 295I, ENGR 395I, or ENGR 495I).

APPLIED FRENCH OPTION: (30 credits)

PRESCRIBED COURSES (3 credits)
FR 430(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
Select 18 credits in related areas such as Hotel, Restaurant, and Institutional Management; Linguistics; Sociology; Economics; Science, Technology and Society, or in another professional areas where competency in French is desirable. The courses are to be selected in consultation with an adviser. At least six credits of such courses must be at the 400 level. (Sem: 1-8)
Select 9 credits in French at the 400 level. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2016
Blue Sheet Item #: 44-04-045
Review Date: 01/12/2016
UCA Revision #1: 8/8/06
LA

Geobiology

*University Park, College of Earth and Mineral Sciences (GEOBI)*

**PROFESSOR PETER J. HEANEY, Associate Head for Undergraduate Programs**

Geobiology is the interdisciplinary study of the Earth and its biosphere. It embraces the history of life and its interactions with the Earth over geologic time; it also includes study of interactions between living organisms and physical and chemical processes in the modern environment on Earth, and possibly elsewhere in the universe. Thus, geobiology encompasses the fields of paleobiology and paleontology, biogeochemistry, geomicrobiology, and astrobiology. The degree program provides students with a strong background in general science and especially in Geosciences and Biology, with core selections from both disciplines. Students gain practical field experience in the study of the physical environment and ecological properties. The senior thesis provides students with hands-on research experience, as well as an emphasis on data synthesis and the written expression of scientific observations and ideas. Students will be well prepared for advanced studies in this emerging discipline, and for careers in the environmental sciences. Geobiology is critical to the study of environmental quality, global change and environmental-human health interactions, all of which have profound importance in legal, economic, and policy arenas.

For the B.S. degree in Geobiology, a minimum of 121 credits is required.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION: 45 credits**
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES :
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 97 credits
(This includes 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.)

PRESCRIBED COURSES (54 credits)
BIOL 110 GN(4), BIOL 220W GN(4), EM SC 100S GWS(3), MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-2)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), PHYS 211 GN(4), PHYS 213 GN(2) (Sem: 1-4)
GEOSC 001(3) [1] (if GEOSC 001 is not available, GEOSC 020 GN(3) may be substituted) (Sem: 1-6)
GEOSC 201(4), GEOSC 204(4) [1] (Sem: 3-6)
GEOSC 310(4)[1] (Sem: 5-6)
GEOSC 494W(3), GEOSC 496(3) (Sem: 7-8)

ADDITIONAL COURSES (13-14 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
Select 4 credits from GEOSC 202(4), GEOSC 203(4) (Sem: 3-6)
Select 3-4 credits from BIOL 230W GN(4), BIOL 240W GN(4), MICRB 201(3) (Sem: 3-6)
Select 3 credits of field experience from BIOL 444(3), GEOSC 472A(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (29-30 credits)
Select 17-18 credits, in consultation with advisor, supportive of the student’s interest. (Students may apply 6 credits of ROTC) (Sem: 3-8)
Select 12 credits, at least 3 credits from each category, from the approved list of evolution, paleobiology and geology courses and biogeochemistry courses (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Summer Session 2007
Blue Sheet Item #: 35-01-129
Review Date: 8/29/06
UCA Revision #: 8/8/06
Department Head Changed: 4/12/05
EM

Geography

University Park, College of Earth and Mineral Sciences (GEOBA)

PROFESSOR CYNTHIA A. BREWER, Head

Penn State’s College of Earth and Mineral Sciences offers a strong mix of human, physical, and technical components that comprise the core of the geography major. Undergraduate degrees in geography are offered in the Bachelor of Science (BS) and in the Bachelor of Arts (BA). Both programs offer an integrated course of study in which students learn fundamental concepts in physical and human geography while developing technical proficiency.

The Bachelor of Arts (BA) stresses the social and behavioral aspects of geography; the Bachelor of Science (BS) major stresses the discipline’s environmental and technical perspectives. Both majors provide training in descriptive and analytical skills such as mapping and spatial analysis. Substantive course work in the Bachelor of Arts major focuses on the ways people have arranged themselves and their economic, social and political activities on the surface of the Earth. Combining geography with other areas of study allows students to choose from a broad range of topics in order to suit their individual interests. The BA Geography major is especially appropriate for students seeking a deeper understanding of the human experience and for students intending to pursue post-graduate work in geography or related disciplines.

Bachelor’s degree program graduates may find employment in federal, state, and local administrative and planning agencies or in private firms that specialize in marketing and environmental research. Geographers make careers doing planning, environmental consulting, policy analysis, demographics, cartography, remote sensing, and geovisualization. They work for government agencies, non-profit and educational institutions, and industry.

Those students seeking a Bachelor of Arts degree in Geography may choose one of three areas of concentration:

GENERAL OPTION: This option is designed to serve the needs of students who want to learn about the various topics and perspectives that comprise the discipline of geography, with emphasis on social and behavioral components. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to emphasize a topic for which no option exists.

HUMAN GEOGRAPHY OPTION: This option offers a program for students interested in a well-rounded education in geography that stresses the social and behavioral aspects of the discipline, including economic geography and political economy; urban/regional development and planning; and cultural/historical geography. The Human Geography option is appropriate both for students who intend to pursue postgraduate degrees and for students who wish to enter careers
related to planning, policy, and development.

**NATURE-SOCIETY GEOGRAPHY OPTION:** This option offers a program for students interested in the interactions between people and their environment that emphasized the complex linkages and multi-scalar processes between the biophysical environment and human societies. The Nature-Society Geography option is appropriate both for students who intend to pursue postgraduate degrees and for students who wish to enter careers related to environmental governance, human dimensions of global change, including climate change, livelihood and ecological sustainability, and ecosystem service provision.

For the B.A. degree in Geography, a minimum of 120 credits is required.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits  
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**  
(Excluded in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**  
(Excluded in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**  
(Excluded in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 9 credits

**BACHELOR OF ARTS DEGREE REQUIREMENTS:** 24 credits  
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)  
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 52 credits[1]  
(This includes 10 credits of General Education courses: 4 credits of GQ courses; 6 credits of GWS courses.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 31 credits

**PRESCRIBED COURSES** (25 credits)  
EM SC 100S GWS(3)[71] (Sem: 1-2)  
GEOG 010 GN(3), GEOG 020 GS;US;IL(3), GEOG 030 GS;IL(3), GEOG 160 GS(3), STAT 200 GQ(4) (Sem: 1-4)  
GEOG 301(3), GEOG 364(3) (Sem: 5-6)

**ADDITIONAL COURSES** (6 credits)  
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)  
Select 3 credits from GEOG 493(3), GEOG 494(3), or GEOG 495(3) (Sem: 5-8)

**REQUIREMENTS FOR THE OPTION:** 21 credits

**GENERAL OPTION:** (21 credits)

**ADDITIONAL COURSES** (21 credits)

**PHYSICAL GEOGRAPHY**  
Select 3 credits from GEOG 110 GN(3), GEOG 111 GN(3), GEOG 115 GN(3), GEOG 310W(3), GEOG 311(3), GEOG 313(3), or GEOG 333(3) (Sem: 3-6)  
Select 3 credits from GEOG 411(3), GEOG 411W(3), GEOG 412W(3), or GEOG 417(3) (Sem: 5-8)

**HUMAN GEOGRAPHY**  
Select 3 credits from GEOG 120 GS;US;IL(3), GEOG 122 GH;US(3), GEOG 123 GS;IL(3), GEOG 124 GS;IL(3), GEOG 126 GS;US;IL(3), GEOG 128 GS;IL(3), or GEOG 130 GS(3) (Sem: 3-6)  
Select 3 credits from GEOG 420Y US;IL(3), GEOG 423Y US(3), GEOG 424 US;IL(3), GEOG 425 US(3), GEOG 426Y US;IL(3), GEOG 427 US;IL(3), GEOG 428 US;IL(3), or GEOG 429 US;IL(3) (Sem: 5-8)

**NATURE-SOCIETY GEOGRAPHY**  
Select 3 credits from GEOG 430(3), GEOG 431(3), GEOG 434(3), GEOG 436(3), GEOG 438W(3), GEOG 439(3), GEOG 444(3) (Sem: 5-8)

**GEOGRAPHIC INFORMATION SCIENCE**  
Select 3 credits from GEOG 361(3), GEOG 362(3), GEOG 363(3), GEOG 364(3) (Sem: 3-6)  
Select 3 credits from GEOG 461W(3), GEOG 463(3), GEOG 464(3), GEOG 467(3), GEOG 468(3) (Sem: 5-8)

**HUMAN GEOGRAPHY OPTION:** (21 credits)

**ADDITIONAL COURSES** (21 credits)  
Select 9 credits from GEOG 120 GS;US;IL(3), GEOG 122 GH;US(3), GEOG 123 GS;IL(3), GEOG 124 GS;IL(3), GEOG 126 GS;US;IL(3), GEOG 128 GS;IL(3), or GEOG 130 GS(3) (Sem: 3-6)  

**NATURE-SOCIETY GEOGRAPHY OPTION:** (21 credits)

**PRESCRIBED COURSES** (9 credits)  
GEOG 130 GS(3), GEOG 333(3) (Sem: 3-6)  
GEOG 430(3) (Sem: 5-8)

**ADDITIONAL COURSES** (12 credits)  
Select 12 credits from GEOG 431(3), GEOG 434(3), GEOG 436(3), GEOG 438W(3), GEOG 439(3), GEOG 444(3) (Sem: 5-8)
A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

The following substitutions are allowed for students attending campuses where the indicated course is not offered:
CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-02-003
Review Date: 09/27/2011
EM (Transferred from the College of the Liberal Arts--effective FA2006)
Department head updated: 8/10/15

Geography

University Park, College of Earth and Mineral Sciences (GEOBS)

PROFESSOR CYNTHIA A. BREWER, Head

Penn State's College of Earth and Mineral Sciences offers a strong mix of human, physical, and technical components that comprise the core of the geography major. Combining geography with other areas of study allows students to choose from a broad range of topics in order to suit their individual interests. Undergraduate degrees in geography are offered in the Bachelor of Science (BS) and in the Bachelor of Arts (BA). Both programs offer an integrated course of study in which students learn fundamental concepts in physical and human geography while developing technical proficiency.

The Bachelor of Science (BS) major stresses the discipline's environmental perspectives, while the Bachelor of Arts (BA) stresses the social and behavioral aspects of geography. Both majors provide training in descriptive and analytical skills such as map reading, cartography, and statistics. Substantive course work in the Bachelor of Science major focuses on the ways people use environmental resources and how they arrange themselves and their economic, social, and political activities on the Earth's surface. The Geography major can provide preparation for a career in business, industry, or government. Geographers with bachelor's degrees are currently being placed in federal, state, and local administrative and planning agencies and in private firms that specialize in planning and development or in environmental and socioeconomic analysis.

Those students seeking a Bachelor of Science degree have a choice of one of three areas of concentration:

GENERAL OPTION: This option is designed to serve the needs of students who want to learn about the various topics and perspectives that comprise the discipline of geography. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to emphasize a topic for which no option exists.

GEOGRAPHIC INFORMATION SCIENCE OPTION: This option helps prepare students for entry-level positions in public and private mapping/remote sensing agencies and firms. The student may specialize in one or all of the areas covered in the option. This option is appropriate for students intending to pursue advanced degrees with specialization in these fields.

PHYSICAL/ENVIRONMENTAL GEOGRAPHY OPTION: This option is appropriate for students who want a broad understanding of the earth and environmental sciences in preparation for careers in industry, commerce, and government. The option is designed to develop competence in description, analysis, explanation, and management of problems arising from human use of natural resources and natural systems.

Geography courses satisfying the United States Cultures and International Cultures requirement: GEOG 020 GS;US;IL(3), GEOG 040 GS;IL(3), GEOG 120 GS;US;IL(3), GEOG 123 GS;IL(3), GEOG 124 GS;IL(3), GEOG 126 GS;US;IL(3), GEOG 128 GS;IL(3), GEOG 420Y US;IL(3), GEOG 424Y US;IL(3), GEOG 426 IL(3), and GEOG 427 US;IL(3).

Geography courses satisfying the Writing requirement: GEOG 310W(3), GEOG 411W(3), GEOG 412W(3), GEOG 420Y US(3), GEOG 423Y US;IL(3), GEOG 424Y US;IL(3), GEOG 438W(3), and GEOG 461W(3). All students must satisfactorily complete at least one writing-intensive course in Geography.

For the B.S. degree in Geography, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 10 credits

REQUIREMENTS FOR THE MAJOR: 77 credits
(This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 47 credits
PRESCRIBED COURSES (28 credits)
EM SC 100S GWS(3) [71] (Sem: 1-2)
GEOG 010 GN(3) [1], GEOG 020 GS;US;IL(3) [1], GEOG 030 GS;IL(3) [1], GEOG 130 GS(3) [1], GEOG 160 GS(3) [1], STAT 200 GQ(4) (Sem: 1-4)
GEOG 301(3) [1], GEOG 364(3) [1] (Sem: 5-6)

ADDITIONAL COURSES (19 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
Select 4 credits from: MATH 083 GQ(4), MATH 110 GQ(4), or MATH 140 GQ(4) (Sem: 1-4)

PHYSICAL GEOGRAPHY
Select 3 credits from: GEOG 110 GN(3) [1], GEOG 111 GN(3) [1], or GEOG 115 GN(3) [1] (Sem: 3-6)

HUMAN GEOGRAPHY
Select 3 credits from: GEOG 120 GS;US;IL(3) [1], GEOG 122 GH;US(3) [1], GEOG 123 GS;IL(3) [1], GEOG 124 GS;IL(3) [1], GEOG 126 GS;US;IL(3) [1], or GEOG 128 GS;IL(3) [1] (Sem: 3-6)

GEOGRAPHIC INFORMATION SCIENCE
Select 3 credits from GEOG 361(3) [1], GEOG 362(3) [1], or GEOG 363(3) [1] (Sem: 3-6)

PROFESSIONALISM
Select 3 credits from : GEOG 493(3) [1], GEOG 494(3) [1], GEOG 495(3) [1], GEOG 495B(3) [1], or GEOG 495G(3) [1] (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 30 credits [1]

GENERAL OPTION: (30 credits) [1]

ADDITIONAL COURSES (30 credits)
Select 12 credits of 400-level courses from the following categories in the option

PHYSICAL GEOGRAPHY
Select 3 credits from GEOG 310W(3), GEOG 311(3), GEOG 313(3), GEOG 411(3), GEOG 411W(3), GEOG 412W(3), or GEOG 417(3) (Sem: 5-8)

HUMAN GEOGRAPHY
Select 3 credits from GEOG 420Y US;IL(3), GEOG 423Y US(3), GEOG 424 US;IL(3), GEOG 425(3), GEOG 426 US;IL(3), GEOG 427 U;IL(3), GEOG 428 US(3), or GEOG 429 US;IL(3) (Sem: 5-8)

NATURE-SOCIETY GEOGRAPHY
Select 3 credits from GEOG 333(3), GEOG 430(3), GEOG 434(3), GEOG 436(3), GEOG 438W(3), GEOG 439(3), or GEOG 444(3) (Sem: 5-8)

GEOGRAPHIC INFORMATION SCIENCE
Select 3 credits from GEOG 361(3), GEOG 362(3), or GEOG 363(3) (Sem: 3-6)

Select 15 credits from all remaining 300- and 400-level GEOG courses (Sem: 5-8)

GEOGRAPHIC INFORMATION SCIENCE OPTION: (30 credits) [1]

PRESCRIBED COURSES (12 credits)
GEOG 361(3), GEOG 362(3), GEOG 363(3) (Sem: 3-6)
GEOG 464(3) (Sem: 5-8)

ADDITIONAL COURSES (18 credits)
Select 18 credits from GEOG 313(3), GEOG 417(3), GEOG 461W, GEOG 463(3), GEOG 467(3), GEOG 468(3), GEOG 485(3), or GEOG 495G(3) (Sem: 5-8)

PHYSICAL/ENVIRONMENTAL GEOGRAPHY OPTION: (30 credits) [1]

PRESCRIBED COURSES (3 credits)
GEOG 313(3) (Sem: 5-8)

ADDITIONAL COURSES (27 credits)
Select 6 credits from GEOG 110 GN(3), GEOG 111 GN(3), or GEOG 115 GN(3) (Sem: 3-6)
Select 9 credits from GEOG 310W(30), GEOG 311(3), GEOG 333(3), or GEOSC 340(3) (Sem: 5-8)
Select 12 credits from GEOG 411(3), GEOG 412W(3), GEOG 417(3), GEOG 430(3), GEOG 431(3), GEOG 434(3), GEOG 438W(3), or GEOG 493(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered:
CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-02-004
Review Date: 09/27/2011
EM
Department head: 8/10/15

Geosciences

University Park, College of Earth and Mineral Sciences (GSCBA)
The geosciences are concerned with understanding earth processes and the evolutionary history of the Earth. Geoscientists work to discover and develop natural resources such as groundwater, metals, and energy sources; to solve technology-generated environmental problems such as acid mine drainage and waste disposal; to predict geological events, such as the occurrence of earthquakes and volcanism; and to solve fundamental questions concerning the origin and evolution of Earth and life. The Bachelor of Arts degree program stresses data collection; investigation, analysis and synthesis of information related to complex natural problems; rigor of thought and clarity of oral and written expression. The B.A. provides a basic education in geosciences, and is designed for students who wish to prepare themselves for careers that interface among science, social science, and business. Examples of these careers include environmental law, national and international planning or resource management, and K-12 teaching.

For the B.A. degree in Geosciences, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 72 credits
(This includes 21 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GWS courses.)

PRESCRIBED COURSES (10 credits)
EM SC 100S GWS[3][71] (Sem: 1-2)
GEOSC 001(3) [1] [if GEOSC 001 is not available, GEOSC 020 GN(3) may be substituted] (Sem: 1-6)
GEOSC 201(4) [1] (Sem: 3-6)

ADDITIONAL COURSES (48-51 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
MATH 140 GQ(4) or MATH 110 GQ(4) (Sem: 1-2)
GEOSC 310(4)[1] or GEOSC 320(3)[1] (Sem: 3-6)
GEOSC 202(4), GEOSC 203(4), or GEOSC 204(4) (Sem: 5-8)
Select 20 credits--two of the following sequences for 8 credits each and the third sequence for 4 credits:
- BIOL 110 GN(4), BIOL 220W GN(4) (Sem: 1-4)
- CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1) (Sem: 1-4)
- PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 1-4)
Note: PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) may substitute for up to 8 credits in Physics for students with MATH 140 GQ(4), MATH 141 GQ(4).
Select 2-4 credits of advanced mathematics in consultation with an adviser; list includes MATH 111 GQ(2), MATH 141 GQ(4), STAT 200 GQ(4), STAT 250 GQ(3) (Sem: 2-6)
Select 6 credits from 300- and 400-level GEOSC courses (Sem: 5-8)
Select 3 credits of appropriate field/laboratory experience in consultation with adviser (Sem: 6-8)
Select 3 credits of writing-intensive courses from within Earth and Mineral Sciences to include, but not limited to: GEOG 412W(3), GEOG 300W(3), GEOSC 402W(3), GEOSC 470W(1-6), METEO 471W(3) (Sem: 6-8)

SUPPORTING COURSES AND RELATED AREAS (11-14 credits)
Select 11-14 credits in consultation with adviser.
(Students may apply 6 credits of ROTC) (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered:
CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Summer Session 2000
Blue Sheet Item #: 28-05-014
Review Date: 10/8/02
UCA Revision #: 8/8/06
EM

Geosciences
University Park, College of Earth and Mineral Sciences (GSCBS)
PROFESSOR PETER J. HEANEY, Associate Head for Undergraduate Programs

The geosciences are concerned with understanding earth processes and the evolutionary history of the Earth. Geoscientists work to discover and develop natural resources such as groundwater, metals, and energy sources; to solve technology-generated environmental problems such as acid mine drainage and waste disposal; to predict geological events, such as the occurrence of earthquakes and volcanism; and to solve fundamental questions concerning the origin and evolution of Earth and life. Our degree programs stress data collection; investigation, analysis and synthesis of information related to complex natural problems; and rigor of thought and clarity of oral and written expression. The B.S. provides a broad foundation in the physical and natural sciences for students who seek immediate employment or post-graduate education in several areas of the geosciences. Examples of careers include the petroleum and mining industries; local or federal resource management; water resources, treatment and management; energy and environmental industries; and academia. A senior thesis involving independent research is required of all students.

Entry to Major Requirements:
In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Geosciences entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140 GQ(4).

GENERAL OPTION: This option is designed to provide sufficient flexibility so that the student has the opportunity to prepare for graduate school by focusing on specialized areas in the geosciences. The option’s flexibility also permits students to develop a broad background in the geosciences in preparation for post-graduate majors that require breadth, such as environmental law.

HYDROGEOLOGY OPTION: This option helps prepare the student for entry-level positions in environmental agencies and firms where a specialized knowledge of groundwater and related areas is required. The option is also appropriate for students wishing to pursue an advanced degree in the area of hydrogeology.

For the B.S. degree in Geosciences, a minimum of 121 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 97 credits
(This includes 21 credits of General Education courses: 9 credits of GN courses, 6 credits of GQ courses, 6 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 69 credits

PRESCRIBED COURSES (66 credits)
BIOL 110 GN(4), EM SC 100S GWS(3)[71], MATH 140 GQ(4)[1], MATH 141 GQ(4) (Sem: 1-2)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), PHYS 211 GN(4), PHYS 213 GN(2) (Sem: 1-4)
GEOSC 001(3) [if GEOSC 001 is not available, GEOSC 020 GN(3) may be substituted] (Sem: 1-6)
GEOSC 201(4)[1], GEOSC 202(4)[1], GEOSC 204(4) (Sem: 3-6)
GEOSC 203(4)[1], GEOSC 310(4)[1], GEOSC 465(4)[1], GEOSC 472A(3), GEOSC 472B(3) (Sem: 5-6)
GEOSC 494W(3), GEOSC 496(1) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)

REQUIREMENTS FOR THE OPTION: 28 credits

GENERAL OPTION: (28 credits)

ADDITIONAL COURSES (14 credits)

SUPPORTING COURSES AND RELATED AREAS (14 credits)
Select at least 2 credits in physics from approved departmental list (Sem: 1-4) Select 3 credits of computer science, mathematics [above the level of MATH 141 GQ(4)], or statistics (Sem: 3-6) Select 9 credits, in consultation with adviser, supportive of the student’s interest (Students may apply 6 credits of ROTC.) (Sem: 3-8)

HYDROGEOLOGY OPTION: (28 credits)

PRESCRIBED COURSE (3 credits)
GEOSC 452(3) (Sem: 5-8)

ADDITIONAL COURSES (15 credits)
Select 3 credits from CMPSC 201 GQ(3), CMPSC 202 GQ(3), CMPSC 203 GQ(4), STAT 250 GQ(3) [if STAT 250 is not available, STAT 200 GQ(4) may be substituted] (Sem: 3-8)
Select 3 credits from A S M 327(3), E R M 450(3), SOILS 101 GN(3) (Sem: 5-8)
Select 9 credits from A and B. Students must select at least 3 credits from A and 3 credits from B.
A. CHEM 202(3), CHEM 450(3), E R M 433(3), GEOSC 413W(3), GEOSC 419(3) (Sem: 3-8)
B. ENVSE 408(3), GEOG 362(3), GEOSC 340(3), GEOSC 439(3), GEOSC 454(3), GEOSC 483(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select at least 2 credits in Physics from approved departmental list (Sem: 1-4)
Select 8 credits, in consultation with advisor, supportive of the student's interest. (Students may apply 6 credits of ROTC) (Sem: 3-8)

Integrated B.S./M.S. Program in Geosciences
The Department of Geosciences offers an integrated B.S./MS. Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Geosciences within 5 years of study. Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S./M.S program by the end of their junior year.

During the first three years, the student follows the course scheduling of one of the options in Geosciences; however, if a student intends to enter the Integrated B.S./M.S. program, he/she would be encouraged to take, wherever appropriate, upper level classes. By the end of the junior year, the student normally would apply for admission to the program. A decision of acceptance would be made prior to the beginning of the senior year and a M.S. Advising Committee appointed. During the senior year, the student would follow the scheduling of the B.S. Geosciences option he/she has selected, with an emphasis on completing 500-level coursework wherever appropriate. In place of the Senior Thesis, the student will complete a M.S. Thesis.

During the fifth year the student will take courses fulfilling the departmental M.S. degree requirements and complete the M.S. Thesis.

Admissions Requirements
Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S./M.S program by the end of their junior year. Typical tests scores of students admitted to the Geosciences Graduate Program are: GPA 3.5, and GRE's Verbal 570 and Quantitative 700. Three letters of recommendation by faculty members for admission to graduate studies are required. The applications are reviewed by the Admissions Committee of the Geosciences Graduate Program and acted upon by the Associate Head for Graduate Programs.

The details of the program requirements can be found in the Graduate Degree Programs Bulletin.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2013 (GSCBS); Summer Session 2005 (Integrated B.S./M.S.)
Blue Sheet Item #: 42-04-019 (GSCBS); 33-04-165 (Integrated B.S./M.S.)
Review Date: 01/14/2014
UCA Revision #1: 8/8/06
UCA Revision #2: 7/27/07

German

University Park, College of the Liberal Arts (GERBA)
PROFESSOR B. RICHARD PAGE, Head

For the B.A. degree in German, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 14 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12
credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination. 
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 37 credits[1]

PRESCRIBED COURSES (15 credits)
GER 301 IL(3), GER 302W(3), GER 310 IL(3), GER 344 IL(3) (Sem: 3-6)
GER 401Y IL(3) (Sem: 5-8)

ADDITIONAL COURSES (22 credits)
GER 201 IL(4) or GER 208Y IL(4) (Sem: 1-4)
Select 3 credits from GER 200 GH IL(3) or German at the 100-level (Sem: 1-4)
Select 6 credits in German literature and culture from GER 420 IL(3), GER 431 IL(3), GER 432 IL(3), GER 440 IL(3), GER 472 IL(3), GER 489(3) (Sem: 5-8)
Select 3 credits in German linguistics and applied linguistics from GER 411 IL(3), GER 412 IL(3), GER 430(3) (Sem: 5-8)
Select 6 additional credits of German at the 300- or 400-level. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Spring Semester 2014
Blue Sheet Item #: 42-06-077
Review Date: 04/08/2014
LA

German

University Park, College of the Liberal Arts (GERBS)

PROFESSOR RICHARD PAGE, Head

The B.S. degree in German is designed to allow students to combine fluency in the German language and culture with other academic disciplines. The German-Business option develops basic German business-communication skills as well as fundamental knowledge of German economics. The German-Engineering and Applied German options have a required overseas study and internship component.

Courses in German literature and culture are essential to all German B.S. options, and students in the German-Business option are encouraged to participate in the University’s study abroad programs in Germany.

For the B.S. degree in German, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-13 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 23-25 credits

REQUIREMENTS FOR THE MAJOR: 55-66 credits[1]
(This includes 0-13 credits of General Education courses: 0-6 credits of GS courses; 0-3 credits of GWS courses; 0-4 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 22 credits

PRESCRIBED COURSES (15 credits)
GER 301 IL(3), GER 302W(3), GER 310 IL(3), GER 344 IL(3) (Sem: 3-6)
GER 401Y IL(3) (Sem: 5-8)

ADDITIONAL COURSES (7 credits)
GER 201 IL(4) or GER 208Y IL(4) (Sem: 1-4)
GER 431 IL(3) or GER 432 IL(3) (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 33-44 credits

APPLIED GERMAN OPTION:
(33 credits)
This option is designed to provide German majors with a background in an area of study where knowledge of German is useful. In consultation with an advisor, majors in this option are required to either study abroad or do an internship that corresponds with their related area of study.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
PRESCRIBED COURSES (9 credits)
GER 200 GH:IL(3) (Sem: 1-4)
GER 399 IL(3), GER 499 IL(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (24 credits)
Select 18 credits in related areas such as Hotel, Restaurant, and Institutional Management; Linguistics; Applied Linguistics; Sociology; Economics; Science, Technology and Society, or in another professional area where competency in German is desirable. The courses are to be selected in consultation with an adviser. At least six credits of such courses must be at the 400 level. (Sem: 1-8)
Select 6 credits in German at the 300 or 400 level. (Sem: 5-8)

Note: A work experience in a German-speaking country may be substituted for GER 399 or GER 499. The work experience may take the form of an internship (LA 495 or GER 495). If the number of work-experience credits for which a student registered is less than 6, the difference in the number of credits must be earned by taking additional courses in consultation with the Department of Germanic and Slavic Languages and Literatures.

GERMAN BUSINESS OPTION: (44 credits)
This option is designed to introduce German majors to the principles of business administration. The curriculum combines an exposure to managerial processes with foreign language competency in German.

PRESCRIBED COURSES (37 credits)
ACCTG 211(4), ECON 102 GS(3), ECON 104 GS(3), I B 303 IL(3), MGMT 100(3) (Sem: 3-4)
ECON 333 GS(3), ENGL 202D GWS(3), FIN 100(3), GER 308Y IL(3), GER 408 IL(3), I B 403(3), MKTG 221(3) (Sem: 5-8)

ADDITIONAL COURSES (7 credits)
SCM 200 GQ(4) or STAT 200 GQ(4) (Sem: 1-8)
Select an additional 3 credits of German courses at the 400 level (Sem: 5-8)

GERMAN ENGINEERING OPTION: (33 credits)
(Open only to students enrolled in an engineering major.)
This option is designed to combine the study of German and Engineering in order to internationalize and enhance the study and practice of the engineering profession.

PRESCRIBED COURSES (12 credits)
GER 308Y IL(3), GER 408 IL(3) (Sem: 5-8)
GER 399 IL(3), GER 499 IL(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 21 credits of engineering courses in consultation with the engineering adviser (Sem: 3-10)

Note: The German Engineering Option is open only to Engineering majors. A work experience in a German-speaking country may be substituted for GER 399 or GER 499. The work experience may take the form of an internship (ENGR 195I) or part of a cooperative education sequence (ENGR 295I, ENGR 395I, or ENGR 495I). If the number of work-experience credits for which a student registered is less than 6, the difference in the number of credits must be earned by taking additional courses in consultation with the Department of Germanic and Slavic Languages and Literatures.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2011
Blue Sheet Item #: 39-05-117
Review Date: 02/22/2011

PROGRAM CURRENTLY ON HOLD;
NOT ACCEPTING NEW STUDENTS
Begin Date of Enrollment Hold: Fall Semester 2015

Global and International Studies

University Park, College of the Liberal Arts (GLOBE)

PROFESSOR CAROLINE ECKHARDT, in charge

The interdisciplinary major in Global and International Studies is intended to prepare students for lives and careers in a world that is increasingly interdependent. It reflects a "One World" concept that emphasizes the importance of global perspectives, foreign language study, and education or working experience abroad. The structure of the major also recognizes the fact that the majority of the world's people live in regions other than the European and North American sphere, and that a knowledge of non-Anglophone cultures is an important form of preparation for global citizenship. Because students need specific fields of knowledge as well as a global framework, this major is available only as a concurrent or sequential major, and students must first have a primary major. Some components of the Global and International Studies requirements may overlap with those of the primary major; for details, consult the adviser for the Global and International Studies major.

The degree (e.g., B.A., B.S., B.F.A., etc.) will normally match that of the student's first major.

Students in baccalaureate degree programs other than those leading to the B.A. who desire a B.A. degree in International Studies will receive concurrent degrees and have to fulfill all requirements for concurrent degrees and for the B.A. degree as indicated under "Concurrent Majors and Sequential Majors" in the GENERAL INFORMATION section of
this bulletin and under "Baccalaureate Degree Requirements" at the beginning of this college section.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MAJOR: 30 credits
This major also requires significant experience abroad, of at least 8 weeks in length. The requirement for experience abroad can be fulfilled by formal study abroad, and/or approved internship or employment or comparable experience (such as Peace Corps service).

PRESCRIBED COURSES (3 credits)
CMLIT 010 GH;IL(3) (Sem: 1-6)

ADDITIONAL COURSES (3 credits)
Select 3 credits in Global Approaches from the following: A&A 100 GA;IL(3), ANTH 045 GS;US;IL(3), CMLIT 013 GH;IL(3), CMLIT 143 GH;US;IL(3), ECON 004 GS(3), FR 139 GH;IL(3), GEOG 040 GS;IL(3), HIST 010 GH;IL(3), HIST 011 GH;IL(3), MUSIC 009 GA;IL(3), PL SC 003 GS;IL(3), PL SC 014 GS;IL(3), RL ST 001 GH;US;IL(3) (Sem: 1-6)

SUPPORTING COURSES AND RELATED AREAS (24 credits)
(Must include at least 12 credits at the 400 level)

A. Foreign Language
Select 12 credits EITHER in a language beyond the 12th -credit-level proficiency OR in a second foreign language, or equivalent proficiencies.[Note; For foreign language majors, study must be in a foreign language other than primary major.] (Sem: 1-5)

B. Global Perspectives (6 credits)
Select from departmental list. One course in this area or in Area C must a 400-level course in CMLIT.

C. World Regions (6 credits)
Select from departmental list. 6 credits in courses focused on one of the following world regions: Africa, Asia and the Pacific, Eastern European and Slavic Cultures, Latin America and the Caribbean, or the Middle East. Language courses beyond the sixth semester are eligible if they focus on significant content beyond language skills. One course in this area or in Area B must be a 400-level course in CMLIT.

Last Revised by the Department: Fall Semester 2009
Blue Sheet Item #: 38-05-100
Review Date: 02/23/2010
UCA Revision #2: 7/27/07
LA

Graphic Design

*University Park, College of Arts and Architecture (GD)*

PROFESSOR KEITH CUMMINGS, Professor in Charge

This degree is intended to prepare students for careers in graphic design. The program includes the technical skills and the creative and intellectual capacity essential to the practices of graphic design and is intended to prepare students for employment in design studios, advertising agencies, packaging, publications and corporate design, film and television graphics, and Web and interactive design.

Acceptance into the Graphic Design major is determined by a portfolio review by faculty after the completion of GD 001S(1), GD 100 GA(3), GD 101(2), GD 102(3), and IST 110 GS(3) with grades of C or better in all of these courses. Typically, this review will take place in the second semester. Applicants who are not accepted into the major may re-apply the following year but must realize that this course of action could delay their graduation by at least one year.

For the B. Des. degree in Graphic Design, a minimum of 121 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3-9 of these 45 credits are included in REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 6-12 credits

REQUIREMENTS FOR THE MAJOR: 73 credits[1]
(This includes 3-9 credits of General Education courses: 3-9 credits of GA courses.)
PRESCRIBED COURSES (61 credits)
GD 001S(1), GD 100 GA(3), GD 101(3), GD 102(3), IST 110 GS(3) (Sem: 1-2)
PHOTO 200(3) (Sem: 2-4)
GD 200(3), GD 201(3), GD 202W(3) GD 203(3), IST 250(3), IST 256(3) (Sem: 3-4)
GD 300(4), GD 301(4), GD 302(4), GD 303(4) (Sem: 5-6)
GD 400(4), GD 402(4), GD 495(3) (Sem: 7-8)

ADDITIONAL COURSES (12 credits)
Select 6 credits from History of the Arts coursework, which may be counted toward General Education Arts requirement.
Select 6 credits from GD 297(3); GD 304(3); GD 310(3); GD 397(3); GD 401(3); GD 404(3); GD 495(3); GD 497(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring 2016
Blue Sheet Item #: 44-06-019A
Review Date: 4/5/2016
R&T Revision 4/8/2014 SCR

Health Policy and Administration

Capital College (HPACA)
University Park, College of Health and Human Development (H P A)
University College: Penn State Lehigh Valley, Penn State Mont Alto (HPACC)
Penn State World Campus

PROFESSOR MARIANNE HILLEMIER, Head of the Department

This major helps prepare students for management and policy positions or graduate study in the field of health care. Students in the major develop the skills and knowledge needed to understand the complex societal problem of providing access to quality health care at reasonable cost. All Health Policy and Administration students complete an internship in a health-care-related setting, giving them valuable experience and contacts in the industry. HPA students study a multidisciplinary curriculum that prepares them to work as health services managers or health analysts. Health services managers, also called health care executives or health care administrators, plan, direct, and coordinate medical, health, and/or long-term care services. They might manage an entire facility or specialize in managing a specific clinical area or department, administer a program or manage a practice for a group of providers. Health analysts are employed throughout the health care industry gathering, compiling, modeling, validating, and analyzing data needed by different organizations of providers, payers, and policy makers. Analysts help these organizations understand the current trends in the health care system and to make well-informed decisions. Both health services managers and analysts must be able to adapt to changes in health care laws, regulations, and technology. HPA students have also used the degree to prepare for graduate study in business, law, medicine or allied health fields, health administration, health services research or policy, and public health.

The requirements for the major are outlined below. Students may select courses in the Supporting Courses and Related Areas category to fulfill requirements for a minor, to develop a specialization, or to complete courses required for admission to medical, dental, law, or other graduate schools.

For the B.S. degree in Health Policy and Administration, a minimum of 120 credits is required.

The integrated B.S. in Health Policy and Administration/Master of Health Administration (MHA) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. H P A requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 4-6 credits

REQUIREMENTS FOR THE MAJOR: (81-83 credits)
(This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.)

PRESCRIBED COURSES (36 credits)[1]
ECON 102 GS(3), PL SC 001 GS(3), (Sem: 1-4)
ADDITIONAL COURSES (15-17 credits)

Select 9 credits from H PA 401 IL(3), H PA 410(3), H PA 420(3), H PA 430(3), H PA 433(3), H PA 440 US;IL(3), H PA 442(3), H PA 445(3), H PA 447(3), H PA 450(3), H PA 460(3), H PA 470(3), H PA 490(3) or H PA 497 (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (30 credits)
(Must include at least 9 credits at the 400 level)
Select 30 credits from University-wide offerings on department list in consultation with adviser (Sem: 5-8)

Integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) Admission and Degree Requirements

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 credits having maintained a cumulative GPA of 3.4 or better

Students admitted to the B.S. in Health Policy and Administration/MHA integrated program are able to earn both the B.S. and MHA in five calendar years of full time academic study.

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015 (H PA); Summer Session 2005 (Integrated B.S./H PA-M.H.A.)

Blue Sheet Item #: 44-02-032 (H PA); 38-06-114A (Integrated B.S./H PA-M.H.A.)

Review Date: 10/13/2015

HH

History

Abington College (HSTAB)
University Park, College of the Liberal Arts (HIST)

PROFESSOR MICHAEL KULIKOWSKI, Head

This major provides a broad introduction to the history of the great civilizations of the world and specific areas of historical inquiry. Centered in one of the basic, traditional disciplines, the History major offers invaluable preparation for students interested in a career in government, international relations, law, or librarianship, as well as essential training for those interested in a professional career as an academic or public historian, archivist, or secondary school teacher. Along with the perspective on the present that a study of the past engenders, the program develops skills in research, analysis, and synthesis that have proved useful in commerce and industry. The History major permits easy combination with minors, area studies, or even a concurrent major, providing flexibility in one's career choice.

For the B.A. degree in History, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Featured in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Featured in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Featured in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits

PRESCRIBED COURSES (3 credits)
HIST 302W(3) (Sem: 5-6)

ADDITIONAL COURSES (6 credits)
Choose one sequence from the following three:
HIST 001 GH;IL(3), HIST 002 GH;IL(3) (Sem: 1-4)
HIST 010 GH;IL(3), HIST 011 GH;IL(3) (Sem: 1-4)
HIST 020 GH;US(3), HIST 021 GH;US(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (27 credits)
Select 12 credits, in consultation with an advisor, at the 100-200-level, one course from each of the following field categories: Europe, United States, Global, Pre-Modern* (Sem: 1-4)
Select 3 credits at the 100-400-level (Sem: 1-8)
Select 12 credits at the 400-level, at least one course which must be in Global History (Sem: 5-8)

* Courses that appear in two History categories (such as HIST 174) cannot be double-counted to be applied to two field categories. However, the student may choose to which category to apply the course.

Integrated B.A./M.A. Program in History
The Department of History offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in History within five years of study. The first two years of undergraduate coursework include the University General Education and Liberal Arts requirements in addition to introductory coursework in the major. In the third year, students are expected to take upper-level courses and the department's undergraduate capstone seminar. By the fourth year students should have selected the primary fields of study and be enrolled exclusively in 400 and graduate-level courses in those areas. The fifth and final year of the program typically consists purely of graduate seminars. The program culminates with an M.A. oral defense of seminar papers that best represents their interests and work written in two of the graduate seminars.

By encouraging greater depth and focus by the beginning of the third undergraduate year, this program will help the student more clearly define his/her area of interest among the four main primary areas of focus in the department’s graduate program. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. With the IUG they would be highly qualified to enter directly into careers in secondary education, and other government positions that require graduate degrees. Students who have completed this program but wish to continue on to a Ph.D. will be more competitive in applying for admission to Ph.D. programs in History and Area Studies but also will be well placed to apply to other professional programs including library science, law, and museum studies.

Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the History B.A. program[1].
2. Must have completed 60 credits of the undergraduate degree program (it is strongly suggested that students apply to the program prior to completing 100 credits).
3. Must be accepted without reservation into the M.A. program in History.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

Degree Requirements
Students must complete the requirements for a B.A. in history.

Students must complete the Master of History Requirements, which total 30 credit hours of graduate instruction, in addition to completing 123 credit hours of undergraduate instruction.

The 400-level courses, totaling 18 credit hours, can double-count towards both the B.A. and Master of History degrees.

Students must complete a minimum of 30 credit hours of graduate instruction over and above the 123 credit hours required of the B.A. degree in history. All 30 of these credit hours must be earned in 400-level, 500-level, or 600-level courses.

These 500-level courses must be grouped into two primary fields of study with a minimum of 6 credit hours in each field.

Student must have satisfactory academic performance to maintain enrollment in the program. A grade point average of 3.0 in the 30 credit hours of graduate instruction is required to receive the master’s degree.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-06-070
Review Date: 04/09/2013
Department head updated by Publications: 3/23/11

Hospitality Management
Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

PROFESSOR Donna Quadri-Felitti, Director and Associate Professor, School of Hospitality Management

This major helps provide preparation for management positions in hotels, restaurants, institutions, and other hospitality organizations. The program is designed to give the student a broad general education and a strong management and problem-solving orientation balanced with the requisite technical skills, all of them essential for career progression to upper-management positions in the hospitality professions. The program also helps prepare students for graduate study.

HOSPITALITY MANAGEMENT OPTION: This option helps prepare students for management positions in any segment of the hospitality industry, including hotels, restaurants, institutional or non-commercial operations, clubs, resorts, and casinos. The management focus helps provide students with the analytical, interpersonal, and organizational skills necessary to effectively function as hospitality professionals.

MANAGEMENT DIETETICS OPTION: This option helps prepare graduates for general management positions within the food services operated by or for medical organizations, health and life care facilities, college feeding, governmental agencies, and community feeding programs. The management dietitian is qualified to solve both nutrition and food service problems. Graduates may also choose to work in the management of commercial food service operations. Together with the necessary clinical experience, the option satisfies the eligibility requirements for membership in the American Dietetic Association.

HOSPITALITY ENTREPRENEURSHIP OPTION: (offered only at Penn State Berks) This option helps prepare students for careers as owners or managers of small independently-owned hospitality operations or as entrepreneurs within large hospitality corporations or management companies in hospitality segments such as a restaurants, hotels, and non-commercial operations. The entrepreneurship focus helps provide students with creative problem solving, opportunity recognition, and leadership skills necessary to effectively manage small or individual unit's hospitality operations.

For the B.S. degree in Hospitality Management, a minimum of 120 credits is required. The B.S. degree program consists of three options: (1) Hospitality Management, (2) Management Dietetics, and (3) Hospitality Entrepreneurship.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. SHM requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(10.5-24 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-5 credits

REQUIREMENTS FOR THE MAJOR: 80.5-99 credits[1]
(For the HM option, this includes 10.5 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; 1.5 credit of GHA courses. For the Management Dietetics option, this includes 24 credits of General Education courses: 6 credits of GQ courses; 9 credits of GN courses; 6 credits of GS courses; 3 credits of GHA courses. For the Hospitality Entrepreneurship option, this includes 3 credits of GS courses and 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 58 credits

PRESCRIBED COURSES (55 credits)
ACCTG 211(4), ECON 102 GS(3), STAT 200 GQ(4) (Sem: 1-4)

ADDITIONAL COURSES (3 credits)
B A 303(3) or MKTG 221(3) (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 22.5-41 credits

HOSPITALITY MANAGEMENT OPTION: (22.5 credits)

PRESCRIBED COURSES (10.5 credits)
HM 355(3), HM 480(3), NUTR 100 GHA(1.5), NUTR 119(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS: (12 credits)
Select 12 credits of HM courses from an approved department list, up to 4 credits of any foreign language, and other courses in consultation with an advisor.

MANAGEMENT DIETETICS OPTION: (41 credits)
**PRESCRIBED COURSES** (38 credits)
B M B 211(3), BIOL 141 GN(3), CHEM 110 GN(3), CHEM 202(3), MICRB 106 GN(3), MICRB 107 GN(1) (Sem: 3-4)
NUTR 251 GHA(3), NUTR 320(3), NUTR 370(1), NUTR 400(1), NUTR 445(3), NUTR 446(3), NUTR 452(3), NUTR 453(3), NUTR 456(2) (Sem: 5-8)

**ADDITIONAL COURSE** (3 credits)
PSYCH 100 GS(3) or SOC 001 GS(3) (Sem: 1-4)

**HOSPITALITY ENTREPRENEURSHIP OPTION:** (24-25 credits)

**PRESCRIBED COURSES** (15 credits)
HM 305(3), HM 319(3), HM 484(3), MGMT 215(3), NUTR 119(3) (Sem: 5-6)

**ADDITIONAL COURSES** (9-10 credits)
Select 9-10 credits from the following: B A 243(4), B A 250(3), ENGR 310(3), MGMT 425(3), MGMT 427(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-06-000
Review Date: 4/14/2015
UCA Revision #1: 8/8/06

HH
School director updated: 4/16/13

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**Human Development and Family Studies**

*Penn State Altoona (HFSAL)*
*Penn State Harrisburg (HFSCA)*
*University College (HFSCC): Penn State Brandywine, Penn State DuBois, Penn State Fayette, Penn State Mont Alto, Penn State Shenango, Penn State Worthington-Scranton, Penn State York*
*College of Health and Human Development (HD FS)*
*World Campus*

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

**PROFESSOR DOUGLAS M. TETI, Head of the Department**

This major is a multidisciplinary program that examines the development of individuals and families across the life span. It enables students to prepare for professional, managerial, or scientific roles in health and human services professions, in public and nonprofit agencies, and in business and industry, as well as for advanced professional or graduate study. Students obtain a broad background in individual and family development across the life span. Courses emphasize biological, psychological, social/cultural, and economic aspects of development. Through course work and undergraduate internships or research projects, students develop skills relevant to career objectives, such as counseling, human assessment, program planning and evaluation, and research.

Two options are available within the major: (1) Life Span Human Services option and (2) Life Span Developmental Science option. The introductory paragraph to each of the options includes a brief list of career opportunities. More extensive descriptions of career opportunities in both public and private sectors are available for the program.

**LIFE SPAN HUMAN SERVICES OPTION:** This option focuses on the acquisition and application of scientific knowledge about development and family functioning across the life span for the purposes of enhancing personal and family development. Courses emphasize: (1) understanding the biological, psychological, and social development across the life span, and the structuring and functioning of families; (2) understanding basic theoretical and methodological issues; and (3) the development of applied skills in intervention and evaluation, prevention, and in the formulation of social policy. An approved field experience in a setting that serves children, youth, adults, or the aged is required for this option. Typical employment settings include preschools, daycare centers, hospital programs for children, youth, and families, institutional and community mental health programs for individuals and families, programs for abused or neglected children and adolescents, women’s resource centers, human resources programs, employee assistance programs, nursing homes, area agencies on aging and other community settings for older adults, and public welfare and family service agencies. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, counseling or social work.

**LIFE SPAN DEVELOPMENTAL SCIENCE OPTION:** This option focuses on the understanding of contemporary methodological approaches to the acquisition of scientific knowledge about individual development over the life span and about family development. This option provides preparation for advanced training in careers in developmental or family research, teaching at a college or university, or for professional careers that require graduate training. Courses within this option emphasize a thorough understanding of the theory and methods of developmental and family theory and research. An approved, multi-semester research practicum is an integral component of this option. Typical postgraduate pursuits of students completing this option include graduate study in human development, family studies, psychology, or sociology, or advanced professional training in psychology, law, behavioral health, social work, or in other programs related to services for individuals and families.

For the B.S. degree in Human Development and Family Studies, a minimum of 120 credits is required.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. HD FS
requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3-4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 3-5 credits

REQUIREMENTS FOR THE MAJOR: 73-76 credits
(This includes 3-4 credits of General Education GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 30-31 credits

PRESCRIBED COURSES (18 credits)[1]
HD FS 129 GS(3), HD FS 301(3), HD FS 311(3), HD FS 312W(3), HD FS 315 US(3)[93], HD FS 418(3) (Sem: 3-6)

ADDITIONAL COURSES (12-13 credits)[1]
Select 6 credits from HD FS 229 GS(3), HD FS 239 GS(3), HD FS 249 GS(3) (Sem: 1-4)
STAT 200 GQ(4) or EDPSY 101 GQ(3) (Sem: 1-4)
Select 3 credits of United States Cultures (US)[92] (Sem: 4-8)

REQUIREMENTS FOR THE OPTION: 43-45 credits

LIFE SPAN HUMAN SERVICES OPTION: (43-45 credits)

PRESCRIBED COURSES (9 credits)[1]
HD FS 411(3), HD FS 414(3), HD FS 455(3) (Sem: 5-8)

ADDITIONAL COURSES (22-24 credits)[1]
Select 3 credits from HD FS 428(3), HD FS 429(3), HD FS 433(3) or HD FS 445(3) (Sem: 5-8)
Select 6 credits from 300- or 400-level HD FS courses (Sem: 5-8)
Select 13-15 credits from (a) or (b)
(a) Approved field practice in a human service setting: HD FS 490(2), HD FS 495A(9), HD FS 495B(3) (Sem: 5-8)
(b) Approved group project or field practice in human service setting: HD FS 401(3), HD FS 402(4), HD FS 495C(6-8) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits (minimum of 6 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in the option (a grade of C or better is required in any HD FS course taken to satisfy this requirement) (Sem: 5-8)

LIFE SPAN DEVELOPMENTAL SCIENCE OPTION: 45 credits

PRESCRIBED COURSES (6 credits)[1]
HD FS 494H(6) or HD FS 494H(6) (Sem: 5-8)

ADDITIONAL COURSES (21 credits)[1]
Select 6 credits from HD FS 428(3), HD FS 429(3), HD FS 433(3), HD FS 445(3) (Sem: 5-8)
Select 15 credits (minimum of 9 credits at the 400-level) from HD FS courses (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 18 credits (minimum of 9 credits at the 400 level) in consultation with adviser from University-wide offerings that develop competency in option (a grade of C or better is required in any HD FS course taken to satisfy this requirement) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[92] This course is in addition to the 6 credits of United States Cultures and International Cultures.
[93] This course fulfills the University’s United States Cultures requirement.

Last Revised by the Department: Summer Session 2006
Blue Sheet Item #: 34-02-111
Review Date: 10/11/05
HH

Immunology and Infectious Disease

University Park, College of Agricultural Sciences (IID)
PROFESSOR PAMELA HANKEY, Program Coordinator
Immunology is the study of how animals and humans protect themselves from pathogens. Understanding basic mechanisms of immunity provides insights into how blood cells develop and how pathogens are recognized and attacked. Furthermore, understanding the concepts behind immunology is necessary for drug and vaccine design. Dysregulation of the processes that regulate immunity can contribute to uncontrolled inflammation, tissue destruction, autoimmunity, immunodeficiencies, leukemia and related cancers. Immunology includes a broad range of disciplines including but not limited to microbiology, virology, animal health, genetics, biochemistry, molecular and cell biology. Students enrolled in the Immunology and Infectious Disease Major will develop and understanding of normal immune responses to bacterial, fungal, and viral agents and appreciate the potential pathological outcomes of these responses. Students will learn about events that shape the immune response; the general biology of pathogens and the mechanisms by which they cause disease. In addition, basic skills in microbiology, molecular biology and biochemistry will be acquired. Students completing a B.S. degree in Immunology and Infectious Disease will be well prepared for veterinary, medical or other professional schools, Ph.D. graduate training in a wide variety of areas including immunology, microbiology, virology, molecular medicine, animal science, molecular biology and biochemistry or highly competitive jobs as research technicians, laboratory assistants or sales representatives with a pharmaceutical company.

In order to be eligible for entrance to the Immunology and Infectious Disease major, a student must have: (1) attained at least a 2.00 cumulative grade point average and (2) completed BIOL 110 GN(4) or BIOL 240W GN(4) or BIOL 230W GN(4) or BIOL 220W GN(4) or BIOL 240W GN(4) or CHEM 110 GN(3) or CHEM 111 GN(1) or CHEM 112 GN(3) or CHEM 113 GN(1) or MATH 140 GQ(4) or MATH 141 GQ(4) and earned a grade of C or better in each of these courses

For the B.S. degree in Immunology and Infectious Disease, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 7-10 credits

REQUIREMENTS FOR THE MAJOR: 89-91 credits
(This includes 15 credits of GENERAL EDUCATION courses; 9 credits of GN courses; 6 credits of GQ courses)

PRESCRIBED COURSES (60 credits)
B M B 401(3) or B M B 402(3) or BIOL 110 GN(4) or BIOL 230W GN(4) or CHEM 110 GN(3) or CHEM 111 GN(1) or CHEM 112 GN(3) or CHEM 113 GN(1) or CHEM 210(3) or CHEM 212(3) or CHEM 213(2) or MATH 140 GQ(4) or MATH 141 GQ(4) or MICRB 201(3) or MICRB 202(2) or MICRB 410(3) or PHYS 250 GN(4) or PHYS 251 GN(4) or VB SC 211 GN(3)
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

ADDITIONAL COURSES (20-22 credits)
Select 4 credits from BIOL 220W GN(4) or BIOL 240W GN(4) or BIOL 230W GN(4) or STAT 200 GQ(4) or STAT 240 GQ(3) or STAT 250 GQ(3) or VB SC 418(2)
Select 3 credits from VB SC 444(3) or BB H/H P A 440(3)
Select 10-11 credits from VB SC 418(2) or VB SC/MICRB/B M B 432(3) or VB SC/MICRB 435(2) or VB SC 445(3) or VB SC 451(3)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits of 400-level courses from departmental list

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Spring Semester 2014
Blue Sheet Item #: 42-06-006
Review Date: 04/08/2014
UCA Revision #: 8/8/06
HH

Program Coordinator updated: 6/19/12

Industrial Engineering

University Park, College of Engineering (I E)

PROFESSOR PAUL M. GRIFFIN, Head, Harold and Inge Marcus Department of Industrial and Manufacturing Engineering

The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial services, communication, information technology, transportation, health care, consulting, or academia.

Program Educational Objectives:
We expect our graduates to:

Participate in and lead cross-functionally defined project teams, designing, implementing and improving processes and systems in the manufacturing, service, or government sectors, using state-of-the-art tools and methodologies;

Work effectively in managerial and leadership positions, to establish and execute engineering and business strategies;

Work and communicate effectively with internal and external stakeholders in the global environment, while satisfying engineering, business and financial goals and the end customers; and

Engage in continuous learning through varied work assignments, graduate school, professional training programs and independent study.

Program Outcomes (Student Outcomes):

These are the specific competencies that our students are taught through the curriculum offered by the department. Our students are expected to know and be able to demonstrate these outcomes by the time they graduate. These relate to the skills, knowledge and behaviors that students acquire as they progress through the program. These are related to the ABET Outcomes (a) through (k). They are listed below.

1.1 Analyze and design both the job and the worksite in a cost-effective manner, as well as measure the resulting output.
1.2 Understand and apply cognitive systems engineering: identify visual, auditory, cognitive, perceptual and environmental aspects of human performance; Perform task analysis and evaluate human-computer interfaces.
1.3 Understand information contained in typical specifications and methods of product verification and conformance to specifications.
1.4 Program flexible manufacturing equipment and system controllers; design logical manufacturing layouts and implement contemporary systems issues.
1.5 Perform work measurement: develop an MTM analysis and carry out a work sampling study.
1.6 Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
1.7 Understand and apply principles of effective human/interface design to address improved human performance, visual displays and software design.

2.1 Ability to apply time value of money and select cost-effective engineering solutions; understand cost-accounting principles.
2.2 Ability to apply probability concepts to solve engineering problems, including reliability issues.
2.3 Ability to apply statistical concepts to solve real life problems, such as hypotheses testing, design of experiments and statistical quality control methods such as process capability and control charts.
2.4 Formulate, solve and analyze the results of linear programming models of real-world applications.
2.5 Formulate, solve and analyze real problems using Markov chains, network models, dynamic programming, queuing theory and inventory models.
2.6 Gain in-depth knowledge of data storage, analysis and visualization related to manufacturing and service domains.
2.7 Ability to create simulation models of manufacturing and service systems and analyze simulation output.
2.8 Ability to apply mathematical models to optimally design and control service systems.

3.1 Present engineering study results in technical reports and orally.
3.2 Demonstrate life-long learning by synthesizing information from several sources.
3.3 Work effectively in groups on case studies and projects.
3.4 Demonstrate knowledge of contemporary issues.
3.5 Understand professional and ethical responsibility.
3.6 Understand the impact of engineering decisions in a global and societal context.

After completing courses required for the core and fundamental competencies in the major, students can choose two technical elective courses from the department list, out of which must be an I E course. In addition, the students must also complete the three-credit capstone design course.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Industrial Engineering, a minimum of 129 credits is required. This baccalaureate program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., [www.abet.org](http://www.abet.org).

**Scheduling Recommendation by Semester Standing given like (Sem:1-2)**

**GENERAL EDUCATION:** 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in REQUIREMENTS FOR THE MAJOR)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 111 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (77 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), EDSGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1]
(Sem: 1-2)
E MCH 210(5)[1], ENGL 202C GWS(3), MATH 220 GQ(2), MATH 231(2), MATH 250(3)[1], PHYS 212 GN(4)[1]
(Sem: 3-4)
I E 302(3)[1], I E 305(3)[1], I E 322(3)[1], I E 323(3)[1], I E 327(3)[1], I E 330(3)[1], I E 405(3)[1], MATSE 259(3)
(Sem: 5-6)

ADDITIONAL COURSES (16 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 1-2)
ECON 102 GS(3) or ECON 104 GS(3) (Sem: 1-2)
I E 408(3), I E 418(3), or I E 419(3) (Sem: 7-8) (The courses not taken to satisfy this requirement can be taken as a track elective. Please see the department list)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 3 credits as a science selection from department list (Sem: 3-4)
Select 6 credits as non-major electives from department list (Sem: 3-8)
Select 3 credits in manufacturing processes from department list. (Sem: 5-6) (The course not taken to satisfy this requirement can be taken as a technical elective. Please see the department list)
Select 6 credits of technical electives from the department list, out of which at least 3 credits must be I E credits.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
FIRST-YEAR SEMINAR:  
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES:  16 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS:  24 credits  
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)  
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR:  40 credits

PRESCRIBED COURSES  
(16 credits)  
IST 110 GS(3)[1], IST 130 GA(3)[1], IST 210(3)[1], IST 220(3)[1] (Sem: 1-4)  
IST 495(1)[1] (Sem: 3-8)  
IST 440W(3)[1] (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS  
(24 credits)[1]  
Select 24 credits of IST and IST-related courses in consultation with academic adviser. (At least 12 credits must be at the 400 level.)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-03-086

Review Date: 11/18/2014

Information Sciences and Technology

Abington College (ISSAB)  
Berks College (ISSBL)  
Capital College (ISSCA)  
University College: Penn State Beaver, Penn State Brandywine, Penn State Greater Allegheny, Penn State Hazleton, Penn State New Kensington, Penn State Lehigh Valley, Penn State Mont Alto, Penn State Schuylkill, Penn State Wilkes-Barre, Penn State Worthington Scranton, Penn State York (ISSCC)  
World Campus  
University Park, College of Information Sciences and Technology (ISTBS)  
Mary Beth Rosson, Associate Dean for Graduate and Undergraduate Studies, College of IST

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

This major is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new “Information Age.” Specifically, the degree will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with considerable interdisciplinary integration in order to expose students to the cognitive, social, institutional, and global environments of IST. Team projects in most courses, a required internship, and a senior capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies of the field.

INFORMATION CONTEXT: PEOPLE, ORGANIZATIONS, AND SOCIETY OPTION: This option focuses on how information technology affects social change and the delivery of information to the consumer. This includes the human-machine interface; organization and retrieval of information; digital libraries; information and telecommunications services; information and media industry structures; software services and intermediaries; telecommunications and information law and policy; sociological aspects of technology change; multimedia; and art, design, and aesthetics.

INFORMATION SYSTEMS: DESIGN & DEVELOPMENT OPTION: This option is focused on expanding the skills needed to develop advanced information technology systems using state-of-the-art tools and techniques. The emphasis is on providing the student with both knowledge in the design, implementation, testing and evolution of complex software systems as well as a set of project-oriented, team-programming experiences.

INFORMATION TECHNOLOGY: INTEGRATION & APPLICATION OPTION: This option is designed to prepare students to use information technology to realize a variety of system-based goals (e.g., reliability, accessibility, efficiency, etc.). It is focused on developing a theoretical foundation and the skill sets needed for integrating information technology into different systems for the purpose of enhancing system performance. The emphasis is on providing the student with both the theoretical frameworks needed to use information technology as a system attribute as well as a set of application-oriented experiences and skills.

Entrance Requirements: To be eligible for entrance to the Information Sciences and Technology (ISTBS) major,
students must:
1. have completed the following entrance-to-major requirements with a grade of C or better in each: IST 110(3); IST 210(3); and IST 220(3).
2. have achieved a minimum cumulative grade point average of 2.00 prior to and through the end of the semester during which the entrance-to-major procedure is carried out.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. Information Sciences and Technology undergraduates may apply for admission to the ISTBS/ISTMS IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
6. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
7. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.
8. For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College:

http://www.shc.psu.edu/students/iug/program/

Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. Thesis or scholarly paper credits may not double-count.

For the B.S. degree in Information Sciences and Technology, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of the Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 8 credits

REQUIREMENTS FOR THE MAJOR: 84 credits
(This includes 12 credits of General Education courses: 6 credits of GQ courses; 3 credits of GS courses; and 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 60 credits

PRESCRIBED COURSES (26 credits)
IST 110 GS(3)[1], IST 210(3)[1], IST 220(3)[1], IST 230(3)[1] (Sem: 1-4)
STAT 200 GQ(4) (Sem: 3-6)
IST 495(1)[1] (Sem: 3-8)
IST 301(3)[1], IST 331(3)[1] (Sem: 5-8)
IST 440W(3)[1] (Sem: 7-8)

ADDITIONAL COURSES (13 credits)
CMPSC 101 GQ(3)[1], CMPSC 121 GQ(3)[1], or IST 140(3)[1] (Sem: 1-4)
ECON 014 GS(3), ECON 102 GS(3), or ECON 104 GS(3) (Sem: 1-4)
ENGL 202C GWS(3) or ENGL 202D GWS(3) (Sem: 1-4)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Attainment of third-level proficiency in a single foreign language (12 credits). Proficiency must be demonstrated by either examination or course work. See the admission section of the general information in this Bulletin for the placement policy for Penn State foreign language courses. (Sem: 1-4)
Select 6 credits of international courses in foreign culture from College-approved list (Sem: 5-8)
Select 3 credits at the 400 level in emerging issues and technologies from College-approved list (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 24 credits

INFORMATION CONTEXT: PEOPLE, ORGANIZATIONS, AND SOCIETY OPTION: 24 credits

PRESCRIBED COURSES (6 credits)[1]
IST 431(3) and IST 432(3) (Sem: 5-8)

ADDITIONAL COURSES (6 credits)[1]
The objectives of the Integrated Undergraduate Graduate Program include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduate majors may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:
1. Must be enrolled in the ISTBS undergraduate degree program.
2. Must have completed 60 credits of an ISTBS undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the **Graduate School application**.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College: [http://www.shc.psu.edu/students/iug/program/](http://www.shc.psu.edu/students/iug/program/)

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program. These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Sample Sequence of Graduate Coursework in Addition to Undergraduate Courses

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<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
<th>MS Credits</th>
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<tbody>
<tr>
<td>Year 1 (Senior Undergraduate Year)</td>
<td>IST 504: Foundations 3 **</td>
<td>IST 505: Research Design (3)**</td>
<td>30*</td>
</tr>
<tr>
<td>Year 2 (Super Senior Undergraduate Year)</td>
<td>IST 600 or IST 594 Thesis Research (3) 3**</td>
<td>Methods course (3)**</td>
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<td>Grad Speciality Course (3)**</td>
<td>IST 600 or IST 594 Thesis Research (3) **</td>
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<td>Grad Speciality Course (3)**</td>
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</table>

* Students admitted to the IUG program may double-count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate option course (IST 411, IST 412, IST 413, IST 420, IST 421, IST 431, IST 432) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement. Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

** Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

*** Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

Student performance will be monitored on an on-going basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: [http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters.](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters.)) For Schreyer Honors College students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements.
requirements. (See Grade Point Average Requirement in the Schreyer Honors College Student Handbook: https://www.shc.psu.edu/documents/academic/handbook/handbook_1415.pdf.) Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[2] Students in the Information Systems: Design and Development Option are expected to take IST 242 prior to taking the prescribed and additional courses for that option.

Last Revised by the Department: Spring Semester 2016
Blue Sheet Item #: 44-04-020
Review Date: 1/26/2016

Integrative Arts

Abington College (IARAB)
Altoona College (IARAL)
University Park, College of Arts and Architecture (INART)

PROFESSOR JANET HARTRANFT, Ph.D., Program Coordinator, University Park

Integrative Arts is an interdisciplinary major available to students who desire a curriculum that crosses over traditional single discipline lines. The Integrative Arts student initially establishes an academic plan with the assistance of an approved adviser. The plan must contain a core component of 42 credits and an elective component of 15 credits. The two components combined must clearly illustrate that the plan has clarity, purpose, and cohesion. All Integrative Arts students must complete 6 credits of history of the arts. These credits may be counted as a part of the major or, if outside the major, may be counted under General Education and/or Bachelor of Arts degree requirements. Consult with advisor for course selection.

For the B.A. degree in Integrative Arts, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 15 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 42 credits
(This includes 6 credits of General Education courses: 6 credits of GA)

SUPPORTING COURSES AND RELATED AREAS: 42 credits[1]
(Must include at least 15 credits at the 400 or equivalent level)
(Must include 6 credits in History of the Arts) [1]

Select 24 credits from an arts area (Sem: 1-8)
Select 12 credits from other arts areas (Sem: 1-8)
Select 6 credits of GA (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2012
Blue Sheet Item #: 41-03-010
Review Date: 11/13/2012

Interdisciplinary Digital Studio

University Park, College of Arts and Architecture (IDS)

PROFESSOR GRAEME SULLIVAN, in charge

This degree represents an interdisciplinary approach to emerging technologies and the arts and design disciplines of the College of Arts and Architecture incorporating architecture, landscape architecture, graphic design, music,
photography, theatre design, and visual arts. The IDS degree begins with a foundation in arts and design [ART 110(3), ART 111(3)] a two semester sequence of linked studio practice and theory courses that cover fundamental ideas and skills in the arts and design disciplines such as drawing, color theory, and 2-d, 3-d, and 4-d design within the context of art and design history and theory. The IDS program builds on this foundational core utilizing selected courses from across the College of Arts and Architecture. These courses range from digital fabrication to sound design and composition in music, theatre, and art, to digitally-based art explorations, to digital photography, to the exploration of virtual architectural and built environment spaces, to digital art and design theory and criticism, to internet exhibitions and publishing. Concurrent with these courses, students progress through the series of IDS studio courses (A&A 110, 210, 310, 410 and 411) in which they will develop ways of learning that will enable them to understand how to work within collaborative professional environments. This will prepare students to meet the varying challenges they will face within client-based arts and design professions.

For the B.Des. Degree in Interdisciplinary Digital Studio, a minimum of 121 credits is required.

_Scheduling Recommendation by Semester Standing given like (Sem:1-2)_

**GENERAL EDUCATION:** 45 credits
(Up to 9 of these credits are included in the REQUIREMENTS FOR THE MAJOR. See description of General Education in the Bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 0-3 credits

**REQUIREMENTS FOR THE MAJOR:** 82 credits
(This includes up to 6 credits of GA courses and 3 credits of GN courses)

**PRESCRIBED COURSES** (36 credits)[1]
A&A 210(3), ART 211Y US(3) (Sem: 3-4)
A&A 310(3) (Sem: 5-6)

**ADDITIONAL COURSES** (40 credits)[1]
(Must include at least 6 credits at the 400 level)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)[1]
Select 6 credits from ART 220(3), ART 411 US(3), ART H 450 US;IL(3), ART H 470 US;IL(3), ART H 250(3) or PHOTO 201(3), INART 055 GA(3) (Sem: 3-8)

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy

Last Revised by the Department: Fall 2015

Blue Sheet Item #: 44-01-031

Review Date: 9/15/2015

AA

**International Politics**

*University Park, College of the Liberal Arts (INTPL)*  
*World Campus*

PROFESSOR LEE ANN BANASZAK, Head

This major, administered within the Department of Political Science, is designed to provide students with a broad, comprehensive education in international politics by offering students options in International Relations, International Political Economy, and Security Studies. While most of the required courses are in the areas of international and comparative politics, the curriculum includes courses in economics, geography, risk analysis, and history. The major provides an opportunity to study in detail a variety of crucial contemporary issues--conflict among and within nations, democratization, economic and political globalization, regional conflicts and the emerging importance of non-state actors--as well as analysis of foreign and economic policy making and security issues in the United States and other nations.

The major prepares students for career opportunities with U.S. government executive agencies dealing with foreign affairs, international and homeland security, and the international economy; with relevant committees of the U.S. Congress; with multinational corporations, banks, and consulting firms; and with international organizations. The major also provides preparation for law and business schools and for graduate study in political science and international
relations.

For the B. A. degree in International Politics, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-3 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 15-18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 39 credits
(This includes 0-3 credits of GS General Education courses.)

REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 9 credits

PRESCRIBED COURSES (3 credits)
PL SC 014 GS;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (6 credits)
PL SC 001 GS(3) or PL SC 007 GS(3)* (Sem: 1-4)
* PL SC 007 is recommended for students choosing the National Security Option

Select 3 credits from PL SC 003 GS;IL(3), PL SC 020 GS;IL(3), PL SC 022 GS;IL(3), PL SC 150(3) (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 30 credits

INTERNATIONAL RELATIONS OPTION: (30 credits)

ADDITIONAL COURSES (18 credits)
Select 3-6 credits (no more than 3 credits may be below the 300 level) from HIST 120 GS;IL(3), HIST 142 GS;IL(3), HIST 143 GH;IL(3), HIST 144 GH;US;IL(3), HIST 173 GH;IL(3), HIST 175 GH;IL(3), HIST 179 GH;IL(3), HIST 181 GH;IL(3), HIST 192 GH;IL(3), HIST 320(3), HIST 420 IL(3), HIST 423 IL(3), HIST 427 IL(3), HIST 430 IL(3), HIST/AAA S 431 US;IL(3); HIST/AAA S 432 IL(3); HIST 434 IL(3); HIST 435(3); HIST 446 US(3); HIST 447 US(3); HIST 452 US;IL(3), HIST 454 US(3); HIST 460 US;IL(3), HIST 467 US;IL(3), HIST 468 IL(3), HIST 473 IL(3), HIST 479 IL(3), HIST 481 IL(3), HIST 486 IL(3) (Sem: 1-8)
Select 3-6 credits (no more than 3 credits may be below the 300 level) from ECON 102 GS(3), ECON 104 GS(3), ECON 333 GS(3) or I B 303 IL(3) (Sem: 1-8)
Select 3-6 credits (no more than 3 credits may be below the 300 level) from GEOG 123 GS;IL(3), GEOG 124 GS;IL(3), GEOG 128 GS;IL(3), GEOG 364(3), GEOG 424 US;IL(3), GEOG 428 US(3), GEOG 430(3), GEOG 431(3), GEOG 438W(3), GEOG 444(3), GEOG 463(3), GEOG 464(3); GEOG 466(3), GEOG 468(3) (Sem: 1-8)
Select 6 credits from PL SC 412(3) or PL SC 481(3) and 3 credits from PL SC 418(3) or PL SC 442(3) (Sem: 4-8)

SUPPORTING COURSES AND RELATED AREAS (12 Credits)
Select 12 credits from 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser. (Sem: 3-8)

and/or:
Select 12 credits of foreign language courses beyond the 12th-credit level (9 of these credits must be at the 400 level. With adviser approval, all 12 credits may be below the 400 level, but must be in addition to the language proficiency for BA requirements) (Sem: 3-8)

NATIONAL SECURITY OPTION: (30 credits)

PRESCRIBED COURSES (9 credits)
CRIM 406(3), SRA 111 GS(3), SRA 211(3) (Sem: 4-8)

ADDITIONAL COURSES (9 credits)
Select 3 credits from ECON 102 GS(3), ECON 104 GS(3), ECON 333 GS(3) or I B 303 IL(3), GEOG 123 GS;IL(3), GEOG 124 GS;IL(3), GEOG 128 GS;IL(3), GEOG 364(3), GEOG 424 US;IL(3), GEOG 428 US(3), GEOG 430(3), GEOG 431(3), GEOG 438W(3), GEOG 444(3), GEOG 463(3), GEOG 464(3), GEOG 466(3), GEOG 468(3), HIST 120 GS;IL(3), HIST 142 GS;IL(3), HIST 143 GH;IL(3), HIST 173 GH;IL(3), HIST 175 GH;IL(3), HIST 179 GH;IL(3), HIST 181 GH;IL(3), HIST 192 GH;IL(3), HIST 320(3), HIST 420 IL(3), HIST 423 IL(3), HIST 427 IL(3), HIST 430 IL(3), HIST/AAA S 431 US;IL(3); HIST/AAA S 432 IL(3); HIST 434 IL(3); HIST 435(3); HIST 446 US(3); HIST 447 US(3); HIST 452 US;IL(3), HIST 454 US(3); HIST 460 US;IL(3), HIST 467 US;IL(3), HIST 468 IL(3), HIST 473 IL(3), HIST 479 IL(3), HIST 481 IL(3), HIST 486 IL(3) (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS (12 Credits)
Select 12 credits from 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser. (Sem: 3-8)

and/or:

Select 12 credits of foreign language courses beyond the 12th-credit level (9 of these credits must be at the 400 level. With adviser approval, all 12 credits may be below the 400 level, but must be in addition to the language proficiency for BA requirements) (Sem: 3-8)

INTERNATIONAL POLITICAL ECONOMY OPTION: (30 credits)

ADDITIONAL COURSES (18 credits)
Select 6 credits: 3 credits from PL SC 412(3) or PL SC 481(3) and 3 credits from PL SC 418(3) or PL SC 442(3) (Sem: 4-8)

Select 9 credits: (no more than 3 credits may be below the 300 level) from ECON 102 GS(3), ECON 104 GS(3), ECON 333 GS(3), ECON 433(3), ECON 434(3), ECON 443(3), ECON 444(3), ECON 451(3), ECON 471(3), ECON 472(3), ECON 474(3), or I B 303 IL(3) (Sem: 1-8)


AF AM/ HIST 431 US; IL (3), HIST 120 GS;IL(3), HIST 142 GS;IL(3), HIST 143 GH;IL(3), HIST 144 GH;US;IL(3), HIST 173 GH;IL(3), HIST 175 GH;IL(3), HIST 179 GH;IL(3), HIST 181 GH;IL(3), HIST 192 GH;IL(3), HIST 320(3), HIST 420 IL(3), HIST 423 IL(3), HIST 427 IL(3), HIST 430 IL(3), HIST/AF AM 432 IL(3), HIST 434 IL(3), HIST 435 IL(3), HIST 446 US(3), HIST 447 US(3), HIST 452 US;IL(3), HIST 454 US(3), HIST 460 US;IL(3), HIST 467 US;IL(3), HIST 468 IL(3), HIST 473 IL(3), HIST 479 IL(3), HIST 481 IL(3), HIST 486 IL(3) (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits from 400-level political science courses in International Relations, Comparative Politics, or Theory/Methodology (excluding courses taken to fulfill other requirements in the major) from an approved department list in consultation with an adviser. (Sem: 3-8)

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in International Politics and Master's in International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in International Politics/M.I.A. in International Affairs) will provide an opportunity for strong students in International Politics to complete a Master’s degree with 5 total years of study.

The demand for graduate training in international affairs will grow significantly in the near future along with the burgeoning requirements for international knowledge and professional experience in commerce, humanitarian service, and public affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program would prepare students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations.

The IUG degree in International Affairs and International Politics is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs’ existing collaborations and interactions with the College of the Liberal Arts.

Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Specific requirements:

1. Must be enrolled in the International Politics B.A. program.
2. Must apply to and be accepted without reservation into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of the undergraduate program/department.

M.I.A. Requirements for the Integrated B.A./M.I.A.

The M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a minimum of 42 credits at the 400 level or higher, at least 18 of which are from six core courses consisting of INTAF 801(3), 802(3), 803(3), 804(3), 805(3) and INTAF 590(3). The remaining credits are attained through completion of the approved elective courses.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either: (i) a master's paper; or (ii) a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of INTAF 594. The master’s paper will involve integrating and showing mastery
of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of INTAF 595. The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows: (i) four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale); (ii) native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or (iii) performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State's proficiency certification process or another pre-approved proficiency assessment may be used. Language study does not provide credits towards the degree.

<table>
<thead>
<tr>
<th>M.I.A Degree</th>
<th>Integrated B.A./M.I.A. Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses (18)</td>
<td>Core Courses (18)</td>
</tr>
<tr>
<td>INTAF 801(3), INTAF 802(3), INTAF 803(3), INTAF 804(3), INTAF 805(3), INTAF 590(3)</td>
<td>INTAF 801(3), INTAF 802(3), INTAF 803(3), INTAF 804(3), INTAF 805(3), INTAF 590(3)</td>
</tr>
<tr>
<td>Electives (21)</td>
<td>Electives (21)</td>
</tr>
<tr>
<td>Course choices are from a pre-approved list in the SIA, or by SIA faculty approved substitution</td>
<td>The following 12 credits may be double counted toward the B.A. and the M.I.A.: PL SC 415(3), PL SC 441(3), PL SC 550(3), PL SC 554(3).</td>
</tr>
<tr>
<td>Capstone (3)</td>
<td>Capstone (3)</td>
</tr>
<tr>
<td>Master's Paper (INTAF 594) or Internship (INTAF 595)</td>
<td>Master's Paper (INTAF 594) or Internship (INTAF 595)</td>
</tr>
<tr>
<td>Total Degree Credits (42)</td>
<td>Total Degree Credits (42)</td>
</tr>
</tbody>
</table>

### Sample Program of Study

A typical sequence of coursework for a student in the IUG program would appear as follows:

<table>
<thead>
<tr>
<th>Year One:</th>
<th>International Politics</th>
<th>PL SC 003; PL SC 014 or PL SC 020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Two:</td>
<td>International Politics</td>
<td>PL SC 001 or PL SC 007; ECON 102 or ECON 104; lower-level history course</td>
</tr>
<tr>
<td>Year Three:</td>
<td>International Politics</td>
<td>Lower-level GEOG; GEOG/HIST or ECON requirement; PL SC 439 or PL SC 442 or other supporting course in PL SC</td>
</tr>
<tr>
<td>Year Four:</td>
<td>Fall Semester</td>
<td>INTAF 801, INTAF 802 and INTAF 803 are required. Additional 400-level PL SC, related course(s), or HIST/GEOG/Economics course(s) may be taken.</td>
</tr>
<tr>
<td></td>
<td>Spring Semester</td>
<td>INTAF 804, INTAF 805 and INTAF 590 are required. Additional 400-level PL SC, related course(s), or HIST/GEOG/Economics course(s) may also be taken.</td>
</tr>
<tr>
<td>Year Five:</td>
<td>24 credits</td>
<td>The following 12 credits may be double counted toward the B.A. and the M.I.A.: PL SC 415(3), PL SC 441(3), PL SC 550(3), PL SC 554(3).</td>
</tr>
</tbody>
</table>

### Tuition Charges, Grant-in-Aid and Assistantships

Students admitted to the School of International Affairs through the IUG with International Politics may be considered to receive financial assistance.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2013

Blue Sheet Item #: 42-03-080

Review Date: 11/19/2013

UCA Revision #: 7/27/07

LA

Dept head last updated by Publications: 4/20/10

### Italian

*University Park, College of the Liberal Arts (IT BA)*
The major offers training in the skills required for fluency in Italian and knowledge in Italian culture, civilization, and literature. Its aim is to open to the student both the traditions of one of the major formative components of the Western world and the continuing vitality of modern Italian and Italian-American life.

As one of the humanistic programs of the College of the Liberal Arts, the Italian major is not designed to be directly vocational. Nevertheless, rigorous training in either of the two Italian major options can prepare students for rewarding and unique careers in business, travel, ministry, banking, and education. In addition, the federal government employs liberal arts graduates with foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. The Italian major is also preparatory for graduate work directed to the Ph.D. degree required for teaching and research in colleges and universities. Students with degrees in the humanities are particularly successful applicants to professional schools, such as law and medicine.

TO VIEW THE Italian Minor (IT).

For the B.A. degree in Italian, a minimum of 122 credits is required for the Italian Language and Literature option, or 123 credits minimum is required for the Italian Studies option.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

**GENERAL EDUCATION:** 45 credits
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 18 credits

**BACHELOR OF ARTS DEGREE REQUIREMENTS:** 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 35 credits

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 9 credits

**PRESENTED COURSES** (3 credits)
IT 301(3) (Sem: 1-4)

**ADDITIONAL COURSES** (6 credits)
IT 130 GH;IL(3) or IT 131 GH;US(3) (Sem: 1-4)
IT 415(3) or IT 490(3) (Sem: 5-8)

**REQUIREMENTS FOR THE OPTION:** 26-27 credits

**LANGUAGE AND LITERATURE OPTION:** (26 credits)
Select 18 credits of which at least 9 credits are courses taught in Italian, and at least 9 credits are at the 400-level (some courses will satisfy both conditions).

For courses taught in Italian, select from:
IT 320(3), IT 325(3), IT 330W(3), IT 412(3), IT 422(3) (Sem: 5-8)
or other courses taught in Italian in consultation with major advisor

For courses at the 400-level, select from:
IT 412(3), IT 422(3), IT 475(3), IT 480(3), IT 485(3), IT 497(1-9) (Sem: 5-8)
or other 400-level courses taught in Italian in consultation with major advisor

Select 8 credits from one of the following a, b, c, d, or e:

a) LATIN 001(4) and LATIN 002(4) (Sem: 1-4)
b) FR 001(4) and FR 002(4) (Sem: 1-4)
c) SPAN 001(4) and SPAN 002(4) (Sem: 1-4)
d) PORT 001(4) and PORT 002(4) (Sem: 1-4)
e) Foreign Study: IT 001(4), IT 002(4), IT 099(1-12), IT 399(1-12) (Sem: 1-8)

or other courses abroad in consultation with major advisor

**ITALIAN STUDIES OPTION:** (27 credits)

**ADDITIONAL COURSES** (27 credits)
Select 27 credits from categories a, b, and c:

a) Select 6 credits from:
IT 320(3), IT 325(3), IT 330W(3), IT 412(3), IT 422(3) (Sem: 5-8)

**NOTE:** Courses in different categories in the Italian Studies option cannot double-count. Example: if a student uses IT 422 to satisfy category A requirements, IT 422 cannot count in category B. Also, in addition to the prescribed IT 415/490 course, Italian Studies majors must take a minimum of 12 credits at the 400-level in categories A, B, and C.

a) Select 6 credits from:
IT 320(3), IT 325(3), IT 330W(3), IT 412(3), IT 422(3) (Sem: 5-8)
or other 300 or 400-level courses taught in Italian in consultation with major advisor

b) Select 12 credits from:
   IT 110(3), IT 230(3) (Sem: 1-4)
   IT 320(3), IT 325(3), IT 330W(3), IT 399(1-12), IT 422(3), IT 475(3), IT 480(3), IT 485(3), IT 497(1-9) (Sem: 5-8)
   or other courses in consultation with major advisor

c) Select 9 credits of 400-level courses in related disciplines from:
   ART H 411(3-9), ART H 414(3), ART H 423(3-9), ART H 456 IL(3), ART H 458 IL(3), CAMS 410(3), CAS 471 US;IL(3), CMLIT 400W(3), CMLIT 401W(3), CMLIT 402W(3), LATIN 400(3), LATIN 402(3-12), LATIN 403(3-12), LATIN 404(3-12), LATIN 420(3-6), LATIN 450W(3), LING 447(3), LING 448(3), PHIL 437 IL(3), PHIL 454(3), PHIL 455(3), PHIL 464(3-6), PHIL 465(3-6), PL SC 431(3), PL SC 432(3) (Sem: 5-8)
   or other courses in consultation with major advisor

NOTE: While some of the courses in related disciplines focus specifically on Italian or Roman topics, other courses on this list endeavor to provide a broader cultural or disciplinary context for students with an Italian Studies orientation. Students will be encouraged to suggest to their major advisor other relevant 400-level special topics courses in other disciplines to satisfy this requirement.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2005

Blue Sheet Item #: 33-03-288
Review Date: 11/23/04
UCA Revision #: 7/27/07

LA

Italian

University Park, College of the Liberal Arts (IT BS)

PROFESSOR CHIP GERFEN, Head

The major encourages students to prepare for careers in which fluency in Italian can be combined with training in other academic disciplines.

TO VIEW THE Italian Minor (IT)

For the B.S. degree in Italian, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

REQUIREMENTS FOR THE MAJOR: 60-72 credits[1]
(This includes 0-12 credits of General Education Courses: 0-9 credits of GS courses, 0-3 credits of GWS courses.)

PRESCRIBED COURSES (15 credits)
   IT 110(3), IT 301(3), (Sem: 1-4)
   IT 320(3) (Sem: 3-8)
   IT 412(3), IT 485(3) (Sem: 5-8)

ADDITIONAL COURSES (48 credits)
Select 15 credits (at least 6 of which must be at the 400-level) from:
   IT 130 GH;IL(3), IT 131 GH;US(3), IT 230 GH(3) (Sem: 1-4)
   IT 325(3), IT 330W(3) (Sem: 3-8)
   IT 415(3), IT 422(3), IT 475(3), IT 480(3), IT 490(3), IT 497(1-9) (Sem: 5-8)
   or other course in consultation with major advisor

Select 33 credits from:
   CAS 200 US;IL(3), CAS 203(3), ECON 102 GS(3), ECON 104 GS(3); ENGL 202C GWS(3) or ENGL 202D GWS(3); HD FS 287W GS;US(3), LING 100 GS(3); PL SC 014 GS;IL(3) or PL SC 020 GS;IL(3); PSYCH 100 GS(3), S T S 100 GH(3) (Sem: 1-4)
ECON 333 GS(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits from one of the following two areas:

(1) Students must complete 9 credits as participants in a Penn State or Penn State-approved education abroad program of a minimum of six weeks in length. At least 3 of these 9 credits must be taught in Italian language.
   Such as:
   IT 001(4), IT 002(4), IT 099 IL(1-12) (Sem: 1-4)
   IT 399 IL(1-12) (Sem: 1-8)
   IT 496(1-18) (Sem: 5-8)
   or other courses abroad in consultation with an advisor for the major.

(2) Select 9 credits of 400-level courses in related disciplines from the following or another 400-level course in consultation with an advisor for the major:
   AM ST 448(3), ART H 411(3-9), ART H 414(3), ART H 423(3-9), ART H 456 IL(3), ART H 458 IL(3), CAMS 410(3), CAS 471 US:IL(3), ENGL 416(3), ENGL 417(3), ENGL 418(3), ENGL 419(3), LATIN 420(3-6), LATIN 450W(3), LING 447(3), LING 448(3), PHIL 454(3-6), PHIL 455(3-6), PHIL 464(3-6), PHIL 465(3-6), PL SC 431(3), PL SC 432(3), PSYCH 457(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2005
Blue Sheet Item #: 33-03-289
Review Date: 11/23/04
UCA Revision #1: 8/8/06
UCA Revision #2: 7/27/07

Japanese

University Park, College of the Liberal Arts (JAPNS)

PROFESSOR ON-CHO NG, Department Head, Asian Studies

The major in Japanese strengthens students' overall skills in internationalism and provides a focus on one of the world's most important nations. The Japanese major is designed for students who want to develop proficiency in speaking, listening, reading, and writing Japanese, and acquire profound knowledge of Japanese culture, history, and civilization in the context of East Asia.

The Japanese major requires students to study abroad in order to deepen their understanding of the language, culture and contemporary society, and to develop intercultural and comparative perspectives.

The major can also help students prepare for graduate study in Japan-related fields and professional careers where proficiency in Japanese is required, such as government services, or multinational companies.

Students planning to teach in public schools should schedule the appropriate courses leading to certification in consultation with an adviser in the College of Education.

For the B.A. degree in Japanese, a minimum of 124 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-9 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVE or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

ELECTIVES: 21-27 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 35 credits[1]
(This includes 0-9 credits of General Education GA, GH, or GS courses.)
(At least 22 credits must be at the 400 level.)
(Students are strongly encouraged to take at least 12 of their credits in Japan, either in a Penn State Education Abroad program or another program subject to departmental approval. For curricular sequencing, the program encourages students to pursue this Education Abroad experience in the fall semester of the junior year, unless the host institution runs on the Japanese academic schedule, in which case study abroad should be in the spring semester, or for the entire year.

**PRESCRIBED COURSES** (20 credits)
JAPNS 110 IL(4) (Sem: 3-4)
JAPNS 401 IL(4), JAPNS 402 IL(4) (Sem: 5-6)
JAPNS 403Y(4), JAPNS 404 IL(4) (Sem: 7-8)

**ADDITIONAL COURSES** (9 credits)
Select 3 credits from JAPNS 120 GH;IL(3) or JAPNS 121 GH;IL(3) (Sem: 1-6)
Select 3 credits from the JAPNS 420-429 level (Sem: 1-8)
Select 3 credits from the JAPNS 450-459 level (Sem: 7-8)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
Select 6 credits pertaining to Japan, such as courses in art history, comparative history, geography, history, Japanese, philosophy, political science, religious studies, theatre arts, or other fields, selected from departmental list (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-03-053
Review Date: 11/08/2011

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**Jewish Studies**

*University Park, College of the Liberal Arts (J ST)*

The Jewish Studies major provides broad inquiry into

the history, culture, society, literature, philosophy, politics, language, and religious beliefs of the Jewish people from Biblical times to the present. By nature interdisciplinary, and emphasizing critical thinking and global engagement, the Jewish Studies major is flexible and adaptable to a wide variety of courses of study. Students in the major must complete a total of thirty (30) credits, at least fifteen (15) of which must be at the 400-level. No more than eight (8) credits of Hebrew may count toward the 30-credit total. All students in the major must complete Jewish Studies 010, an introduction to Jewish Civilization, and select from approved lists or in consultation with the Director three courses that address Jewish studies across its history: one course in Jewish Studies of the Ancient through the Medieval periods, one course in Jewish Studies of the Early Modern through the Contemporary periods, and one course in Jewish Studies of the Diaspora. All students in the major are particularly encouraged to participate in a relevant internship, education abroad programs, and/or archaeological fieldwork for which course credits and scholarships are available. Penn State students also may enroll to study abroad at a university in Israel, and up to 15 credits of related education abroad courses in any country may be applied to requirements for the major in consultation with the advisor.

For the B.A. degree in Jewish Studies, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits
(See description of General Education in front of Bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**ELECTIVES:** 21 credits

**BACHELOR OF ARTS DEGREE REQUIREMENTS:** 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 30 credits[1]
(15 of these must be at the 400-level. No more than 15 credits in courses numbered 099, 199, 299, 399, or 499 may count toward the requirements for the major.)

**PRESCRIBED COURSES** (3 credits)
JST/HEBR 010 GH;IL(3) (Sem: 1-4)

**SUPPORTING COURSES AND RELATED AREAS** (27 credits)
Select 3 credits in Jewish Studies in the Ancient Period through Medieval Period from approved program list or in consultation with the director (Sem: 1-8)
Select 3 credits in Jewish Studies from the Early Modern Period through the Contemporary period from approved program list or in consultation with the director (Sem: 1-8)
Select 3 credits in Jewish Studies concerned with Jewish culture in Diaspora from approved program list or in consultation with the director (Sem: 1-8)

(No more than 8 credits of Hebrew Language courses may count toward the requirements for the major)
Select 18 credits from Jewish Studies, Hebrew, or appropriate courses in Anthropology, Classics and Ancient Mediterranean Studies, Comparative Literature, English, History, Philosophy, or Religious Studies from approved program list (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-02-030
Review Date: 10/7/2014
LA

Journalism

*University Park, College of Communications (JOURN)*

PROFESSOR FORD RISLEY, Head, Department of Journalism

The goal of the major is to provide students with the critical thinking, ethical, legal and professional skills that will enable them to enter positions in all areas of journalism.

Students must select at least 80 credits in non-COMM courses, including at least 65 credits in the liberal arts and sciences.

The following three options are offered:

**BROADCAST JOURNALISM OPTION:** This option is designed for students interested in radio, television, and/or multimedia journalism as a reporter, editor, or producer. Students are trained in the techniques of audio/video and online reporting and editing. They take two required courses that provide instruction in the basic skills of reporting and editing and choose two other courses that provide advanced instruction in these areas.

**DIGITAL AND PRINT JOURNALISM OPTION:** This option is designed for students interested in newspaper, magazine and/or multimedia journalism as a reporter, editor, or producer. Students are trained in the techniques of print and online reporting and editing. They take two required courses that provide instruction in the basic skills of reporting and editing and choose two other courses that provide advanced instruction in these areas.

**PHOTOJOURNALISM OPTION:** This option is designed for students interested in photo and/or multimedia journalism as a photographer, editor or producer. Students are trained in the techniques of still/video photography and editing. They take two required courses that provide instruction in the basic skills of photography and editing and choose two other courses that provide advanced instruction in these areas.

For the B.A. degree in Journalism, a minimum of 120 credits is required.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 2 credits

**BACHELOR OF ARTS DEGREE REQUIREMENTS:** 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 49 credits[1]

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 31 credits

**PRESCRIBED COURSES** (13 credits)
COMM 160(1) (Sem: 1-2)
COMM 260W(3) (Sem: 3-4)
COMM 271(3) (Sem: 3-6)
COMM 403(3), COMM 409(3) (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (18 credits)
Select 18 credits for completion of a University-approved minor (Sem: 1-8)
[Students majoring in journalism must take a University-approved minor outside the College of Communications. The minimum requirement for a minor is 18 credits. By careful planning, a student may use General Education and Bachelor of Arts courses to help fulfill this requirement. In lieu of a minor, students may take a concurrent major or concurrent degree, as long as it is outside the College of Communications. Students should consult with their adviser as soon as possible about this requirement.] (Sem: 1-8)

REQUIREMENTS FOR THE OPTION: 18 credits
Options can be combined but only with the consent of a student's adviser.

BROADCAST JOURNALISM OPTION (18 credits)

PRESCRIBED COURSES (6 credits)
COMM 360(3), COMM 465(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
Select 6 credits from COMM 400(3), COMM 402(3), COMM 466(3), COMM 475(3), COMM 480(6), COMM 481(3), COMM 495(1-3)[17] (Sem: 5-8)

DIGITAL AND PRINT JOURNALISM OPTION (18 credits)

PRESCRIBED COURSES (6 credits)
COMM 460W(3), COMM 467(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)

PHOTOJOURNALISM OPTION (18 credits)

PRESCRIBED COURSES (6 credits)
COMM 269(3), COMM 469(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
Select 6 credits from COMM 402(3), COMM 463(3), COMM 467(3), COMM 468(3), COMM 475(3), COMM 481(3), COMM 495(1-3)[17] (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[17] Internship in news with newspaper, radio, or TV. See the director of the internship program for specifics.

Last Revised by the Department: Fall Semester 2013
Blue Sheet Item #: 42-03-015
Review Date: 11/19/2013
CM

Kinesiology

Berkers College (KINBL)
Capital College
University Park, College of Health and Human Development (KINES)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

PROFESSOR NANCY I. WILLIAMS, Head, Department of Kinesiology

Kinesiology offers a comprehensive program of study in the science of human movement and is designed for students who want to prepare for professions involving physical activity and for graduate study in related areas. The Kinesiology major options are: Applied Exercise and Health; Movement Science; and Exercise Science (offered only at Penn State Berks). All options require a culminating practicum or research experience. Relocation away from the University Park campus is generally necessary for the practicum. All options require a minimum of 120 credits for graduation. Additional requirements are mandated by the Pennsylvania Department of Education (PDE) for entrance to the Health and Physical Education (HPE) certification emphasis in the Applied Exercise and Health Option (AEH). Information about the major and its options can be found at http://hhd.psu.edu/kines

Students who have completed a minimum of 29.1 credits and have a 2.00 cumulative grade-point average are eligible for entrance into the major after completing an Entrance to Major form.

APPLIED EXERCISE AND HEALTH OPTION: This option provides applied interdisciplinary training in the foundations of the scientific understanding of exercise and health through the lifespan. Students identify one of two areas of emphasis that are certification-based and practice-oriented: (a) courses and practical experiences directed toward certification by organizations such as the American College of Sports Medicine (ACSM) or the National Strength and Conditioning Association (NSCA), or (b) a series of courses and student teaching leading to teacher certification. In order to qualify for
the teacher certification track, students must meet the requirements mandated by the Pennsylvania Department of Education (PDE). The completion of the Applied Exercise and Health Option will prepare students to work in the private or corporate fitness arenas, community-based fitness organizations, and university or hospital settings, or be Pennsylvania certified in health and physical education (K-12) and secure teaching positions in public or private schools.

**MOVEMENT SCIENCE OPTION:** This option provides interdisciplinary scientific training in academic areas such as biomechanics, exercise physiology, movement neuroscience, psychology of physical activity, and sport history and philosophy to understand movement for prevention and diagnosis of chronic disease, rehabilitation and treatment, and/or theoretical study. Students are prepared for graduate study in many clinical fields including medicine, physical therapy, occupational therapy, physical assistant, cardiac rehabilitation, as well as a broad range of careers in biomedical and health-related fields.

**EXERCISE SCIENCE OPTION:** (offered only at the Penn State Berks) This option is a program of study in the science of exercise. This program offers Kinesiology background and applied experience in fitness assessment, exercise physiology, exercise psychology, motor skill development, nutrition and healthy living skills. Graduates will be able to scientifically assess fitness levels of individuals. Analyzing those assessments, graduates will then be capable of designing and implementing appropriate exercise programs. Students in the Business Emphasis can obtain a Business Minor through this program. Students acquire basic business skills in accounting, marketing, management and entrepreneurial skills. Students choosing the Science Emphasis will select courses from a department list that will enhance their opportunity for graduate studies in Kinesiology-related fields, physical therapy and medical schools. The completion of the Exercise Science Option will enable graduates to compete for employment in the corporate fitness arena, private fitness clubs, community-based fitness organizations, hospital and university settings or possibly to operate their own health and fitness company.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. KINES requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

**GENERAL EDUCATION:** 45 credits

(18-27 of these credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 2-7 credits

**REQUIREMENTS FOR THE MAJOR:** 95-109 credits

(This includes 18-27 credits of General Education courses: Applied Exercise and Health Option - 9 credits GN, 6 credits GQ, 3 credits of GH, 6 credits of GS and 3 credits of GHA. Movement Science Option - 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GHA courses. Exercise Science Option - 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHA courses.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 41-43 credits

**PRESCRIBED COURSES** (28 credits)[1]

BIOL 141 GN(3) (Sem: 1-4)
KINES 202(4), NUTR 251 GHA(3) (Sem: 3-4)
KINES 321(3), KINES 341 US;IL(3), KINES 345(3), KINES 350(3), KINES 360(3), KINES 384(3) (Sem: 3-6)

**ADDITIONAL COURSES** (13-15 credits)[1]

Select 3 credits: KINES 100(3); KINES 141 US;IL(3) (Sem: 1-4)
Select 3 credits: KINES 180(3); KINES 101(3) (Sem: 1-4)
Select 1 credit: KINES 295B(1); KINES 295(1) (Sem: 1-4)
Select 3-4 credits: PHYS 150 GN(3); PHYS 250 GN(4) (Sem: 1-4)
Select 3-4 credits: STAT 200 GQ(4); or STAT 250 GQ(3); or SCM 200 GQ(4) (Sem: 2-6)

**REQUIREMENTS FOR THE OPTION:** 54-66 credits

**APPLIED EXERCISE AND HEALTH OPTION:** (62-66 credits)

**PRESCRIBED COURSES** (34 credits)

CHEM 101 GN(3)[1], C I 280 GH(3), EDPSY 010 GS(3)[1], KINES 200(3)[1], KINES 201(3)[1], KINES 267(3)[1], KINES 367(1)[1], KINES 368(2) [1], KINES 401(3)[1], KINES 455(3)[1], KINES 456(4)[1], PSYCH 100 GS(3)[1] (Sem: 2-6)

**ADDITIONAL COURSES** (3 credits)

MATH 026 GQ(3) or Satisfactory performance on the MATH placement examination--i.e., placement beyond the level of MATH 026 (Sem: 1-2).

**SUPPORTING COURSES AND RELATED AREAS** (25-29 credits)

Take the following required courses with selected emphasis area:

a. HPE Certification Emphasis (Sem: 7-8)
KINES 366(3), KINES 395A(1), KINES 400(3), KINES 464(3), KINES 468W(3), SPLED 400(4) (Sem: 7)
KINES 495A(12) (Sem: 8)

b. ACSM/NSCA Certification Emphasis (Sem: 7-8)
KINES 395(1), KINES 421(3), KINES 457(3), KINES 485(3), KINES 492W(3)
KINES 495B(6), KINES 495E(3) (Sem: 8)

MOVEMENT SCIENCE OPTION: (54-56 credits)

PRESCRIBED COURSES (24 credits)
BIOL 110 GN(4), BIOL 142(1), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1) (Sem: 1-4)
PHYS 251 GN(4), PSYCH 100 GS(3) (Sem: 3-6)
KINES 395B(1) (Sem: 5-8)
KINES 495B(6) (Sem: 7-8)

ADDITIONAL COURSES (21-23 credits)
CHEM 106 GN(5)[1], or CHEM 110 GN(3)[1] (Sem: 1-4)
MATH 026 GQ(3)[1]; or Satisfactory performance on the MATH placement examination--i.e., placement beyond the level of MATH 026 (Sem: 1-4)

Select an additional 15 credits from approved 400-level KINES courses:

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in University-wide offerings from an approved list, in consultation with advisor. (Sem: 1-8)

EXERCISE SCIENCE OPTION: (54-56 credits)

PRESCRIBED COURSES (29 credits)[1]
KINES 200(3), KINES 201(3), KINES 260(3), (Sem: 3-4)
KINES 356(3), KINES 358(l) (Sem: 5-6)
KINES 420(3), KINES 456(4), KINES 457(3), KINES 495C(6) (Sem: 7-8)

ADDITIONAL COURSES (9-11 credits)
CHEM 101 GN(3)[1]; or CHEM 106 GN(5)[1]; or CHEM 110 GN(3)[1] and CHEM 111 GN(1)[1] (Sem: 1-2)
MATH 022 GQ(3)[1]; or Satisfactory performance on the MATH placement examination--i.e., placement beyond the level of MATH 022 (Sem: 1-2)

Select 3 credits from KINES 001 GHA(1.5) to KINES 099(3) (Sem: 1-2)

SUPPORTING COURSES AND RELATED AREAS (16 credits)
Select 16 credits from one of the following emphasis area from an approved list, in consultation with advisor. At least 3 credits must be at the 400 level.
b. Science Emphasis (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-03-043
Review Date: 11/17/2015
UCA Revision #1: 8/8/06
HH

Labor and Employment Relations

University Park, College of the Liberal Arts
World Campus

PROFESSOR PAUL CLARK, Head

This major permits students to undertake a study of work and the employment relationship in the context of a liberal arts education. A broad foundation of theoretical and professional knowledge is provided through a multidisciplinary approach. The B.A. and B.S. degrees draw on the perspectives of disciplines such as industrial relations, economics, history, law, sociology, and psychology. This focus includes the nature and functions of the institutions involved in the employment relationship. The B.S. degree requires more course work in quantification than the B.A. degree.

Graduates of Labor and Employment Relations are equipped for employment in business, government, and labor organizations as labor relations specialists, personnel and human resource specialists, researchers, organizers, consultants, and professionals in mediation and arbitration. The degree is also appropriate preparation for graduate study and law school.

For the B.A. degree in Labor and Employment Relations, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
Labor and Employment Relations

University Park, College of the Liberal Arts
World Campus

PROFESSOR PAUL CLARK, Head

This major permits students to undertake a study of work and the employment relationship in the context of a liberal arts education. A broad foundation of theoretical and professional knowledge is provided through a multidisciplinary approach. The B.A. and B.S. degrees draw on the perspectives of disciplines such as industrial relations, economics, history, law, sociology, and psychology. This focus includes the nature and functions of the institutions involved in the employment relationship. The B.S. degree requires more course work in quantification than the B.A. degree.

Graduates of Labor and Employment Relations are equipped for employment in business, government, and labor organizations as labor relations specialists, personnel and human resource specialists, researchers, organizers, consultants, and professionals in mediation and arbitration. The degree is also appropriate preparation for graduate study and law school.

For the B.S. degree in Labor and Employment Relations, a minimum of 123 credits is required.

Per Senate Policy 83-80-5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6-10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)
ELECTIVES: 23-28 credits

REQUIREMENTS FOR THE MAJOR: 61-62 credits[1]
(This includes 6-10 credits of General Education courses; 6 credits of GS courses; 0-4 credits of GQ courses.)

PRESCRIBED COURSES (21 credits)
(Some courses in this category have prerequisites that are not included in the major.)
ECON 102 GS(3), ECON 315 GS(3), LER 100 GS(3), PSYCH 281 GS(3) (Sem: 1-8)
LER 312(3), LER/HIST 458 Y US(3), LER 460(3) (Sem: 3-8)

ADDITIONAL COURSES (13 credits)
(Some courses in this category have prerequisites that are not included in the major.)
SCM 200 GQ(4) or STAT 200 GQ(4) (Sem: 3-8)
LER 201 GS(3) or LER 401(3) (Sem: 5-8)
LER 488(1.5) and LER 489(1.5) or select 3 credits in consultation with your adviser (Sem: 6-8)

SUPPORTING COURSES AND RELATED AREAS (27-28 credits)
(LER courses that are used in the Additional Courses category may not be double-counted to satisfy this requirement. Some courses in this category have prerequisites that are not included in the major.)
Select 12-13 credits in consultation with adviser from the department list, at least 6 at the 400-level,
Select 15 credits from appropriate LER courses, at least 9 credits the the 400-level (only 3 credits of LER 495 or LER 496 may be sued to satisfy this requirement) (Sem: 5-8)

Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations (LRHRER)

PROFESSOR PAUL F. CLARK, Head

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about (1) the roles of employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) and how to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

Admission Requirements

Admission to the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

1. must be enrolled in the LER B.S. program;
2. must complete the Penn State graduate degree application form and pay the application fee
3. must have completed 60 credits of the undergraduate degree program when they officially apply for the M.S. (it is strongly suggested that students apply to the program prior to completing 100 credits)
4. should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
5. must obtain letters of recommendation from the chairs of the Department's undergraduate and graduate committees, and
6. must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department's undergraduate and graduate committees), and a career statement.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

Bachelor of Science

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 23-28 credits

B.S. REQUIREMENTS: 61-62 credits
(This includes 10 credits of General Education courses; 6 credits of GS; 0-4 credits of GQ courses)
Integrated B.S. in Labor and Employment Relations and M.P.S. in Human Resources and Employment Relations

The integrated B.S. and HRER M.P.S. is a five-year program designed for academically talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to (1) the roles employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, (3) the laws that form the legal framework for the employee-employer relationship, and (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with a research project which is completed through the capstone course, HRER 894. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.

A minimum of 33 credits is needed to complete the MPS degree in HRER. Nine credits (400 level and above) can apply to both undergraduate and graduate degrees; six of these must be at a 500 or 600 level.

Admission Requirements

Admissions decisions for the B.S./M.P.S. program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.P.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- must complete the Penn State graduate degree application and pay the application fee;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (should be professional or academic);
must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills;
must present an approved plan of study (to be determined in consultation with the student’s undergraduate adviser and the Graduate Director, and to be signed by both); and
must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

The M.P.S. requires 33 credits at the 400 level or higher; at least 6 credits must be at the 500 level.
Nine (9) of 33 credits can be double counted for B.S. and M.P.S. At least 6 of these must be at the 500 or 800 level.

**Prescribed Courses (24 credits)**

**Human Resources and Employment Relations (HRER)**

- 501. Labor and Employment Law (3 credits)
- 504. Seminar in Industrial Relations (3 credits)
- 505. Seminar in Human Resources (3 credits)
- 800. International Context of HRER (3 credits)
- 802. Organizations in the Workplace (3 credits)
- 816. Labor Market Analysis (3 credits)
- 836. Diversity in the Workplace (3 credits)
- 894. Research Project (3 credits)

**Areas of Concentration (6 credits)**

Select 6 credits in area of concentration.

**Benefits and Compensation**

- LER 424. Employment Compensation (3 credits)
- LER 425. Employment Benefits (3 credits)

**Employment and Labor Law**

- LER 401. Law of Labor-Management Relations (3 credits)
- HRER 811. Labor and Employment Law II (3 credits)

**Labor and Collective Bargaining**

- LER 401. Law of Labor-Management Relations (3 credits)
- LER 435. Labor Relations in the Public Sector (3 credits)

**Staffing, Training, and Development**

- LER 426 Staffing and Training (3 credits) or WF ED 471 Training in Industry and Business (3 credits)
- WF ED 573 Needs Assessment for Industrial Trainers (3 credits)

**Elective Courses (3 credits)**

Select an additional 3-credit course from the following list of LER, HRER, and WF ED courses.

**Labor and Employee Relations (LER)**

- 401. Law of Labor-Management Relations (3 credits)
- 424. Employment Compensation (3 credits)
- 425. Employment Benefits (3 credits)
- 426. Staffing and Training (3 credits)
- 435. Labor Relations in the Public Sector (3 credits)
- 444. Occupational Health: Policy and Practice (3 credits)
- 445Y. Politics of Affirmative Action (3 credits)
- 460. Human Resource Ethics (3 credits)
- 484. Communication Skills for Leaders in Groups and Organizations (3 credits)
- 485. Collective Decision Making (3 credits)
- 472. Work-Life Practices and Policies (3 credits)

**Human Resources and Employee Relations (HRER)**

- 811. Labor and Employment Law II (3 credits)

**Workforce Education and Development (WF ED)**

- 471. Training in Industry and Business (3 credits)
- 573. Needs Assessment for Industrial Trainers (3 credits)

**Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID](#) section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below
the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list**

**LABOR AND EMPLOYMENT RELATIONS (LER) course list**

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2014

Blue Sheet Item #: 43-01-070; IUG 41-05-127

Review Date: 08/19/2014

UCA Revision #1: 8/8/06

UCA Revision #2: 7/27/07

**Landscape Architecture**

*University Park, College of Arts and Architecture (LARCH)*

**PROFESSOR ELIZA PENNYPACKER, Head, Department of Landscape Architecture**

Landscape architecture is the art of design, planning, or management of the land and of the natural and built elements upon it. As an academic discipline, it embodies creative, cultural, philosophical, and scientific knowledge bases. As a professional discipline, the practice of landscape architecture includes site design, urban design, master planning, community planning, regional planning, resource conservation, and stewardship.

For those selected to major in this field, the program is a five-year curriculum leading to a professionally accredited Bachelor of Landscape Architecture degree. A minor is strongly encouraged. One semester of the curriculum is spent in a required semester abroad. The program helps prepare graduates for either advanced study or professional careers. The curriculum develops both the creative disciplines and the technical skills essential to practice, as well as to the pursuit of interests in related fields. With appropriate work experience with a registered practitioner, graduates are eligible to take the state licensing examinations.

For the Bachelor of Landscape Architecture degree, a minimum of 151 credits is required.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**GENERAL EDUCATION:** 45 credits

(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in front of Bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 17-18 credits

**REQUIREMENTS FOR THE MAJOR:** 103-104 credits

(This includes 15 credits of General Education courses: 3 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses.)

**PRESCRIBED COURSES** (91 credits)

LARCH 060 GA;US;IL(3)[1], LARCH 065 GA;US;IL(3)[1], LARCH 112(3)[1], LARCH 121(1)[1], LARCH 151(3)[1], SOILS 101 GN(3) (Sem: 1-2)

LARCH 211(4)[1], LARCH 212(4)[1], LARCH 221(1)[1], LARCH 222(1)[1], LARCH 231(3)[1], LARCH 241(3)[1], LARCH 251(3)[1], LARCH 272(1)[1] (Sem: 3-4)

LARCH 311(4)[1], LARCH 312(4)[1], LARCH 321(1)[1], LARCH 322(1)[1], LARCH 331 IL(3)[1], LARCH 332(3)[1], LARCH 341(3)[1], LARCH 361W(3)[1] (Sem: 5-6)

LARCH 382(3)[1], LARCH 414 (5 per semester maximum of 15)[1], LARCH 424(3)[1], LARCH 431(3)[1], LARCH 499A IL(1)[1], LARCH 499B IL(5)[1], LARCH 499D IL(3)[1] (Sem: 7-10)

**ADDITIONAL COURSES** (12-13 credits)

MATH 026 GQ(3) or higher (except MATH 034 and MATH 035); BIOL 011 GN(3) and BIOL 012 GN(1) or BIOL 127 GN(3) (Sem: 1-2)

GEOG 020 GS;US;IL(3) or GEOG 030 GS;IL(3) (Sem: 1-2)

EARTH 100 GN(3) or GEOG 115 GN(3) or GEOG 610 GN(3) (Sem 1-2)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2011 (LARCH); Fall Semester 2009 (Integrated B.L.A./M.L.A.)

Blue Sheet Item #: 40-01-015 (LARCH); 37-07-002 and 37-07-000 (Integrated B.L.A./M.L.A.)

Review Date: 08/16/2011

AA
Landscape Contracting

University Park, College of Agricultural Sciences (LSCPE)

PROFESSOR DAN T. STEARNS, Program Coordinator

Landscape contracting involves constructing, establishing, and maintaining landscapes from small residential projects to large commercial and industrial projects, as well as producing plans for small-scale residential and commercial sites. Students develop skills in construction, site design, plant material usage, plant establishment, and landscape maintenance. Students are also educated in areas such as graphics, surveying, soils, turfgrass management, weed and pest management, and in business operations.

Students are encouraged to obtain on-the-job experience in landscape contracting by working with a landscape maintenance or construction firm, or other related business. Credits for this experience are available for those who choose to enroll in an internship.

A wide variety of opportunities exist for landscape contracting graduates. They may be employed by design/build firms, landscape management firms, nurseries, or garden centers. Others may choose to work for municipalities, golf courses, parks, or botanical gardens.

**DESIGN/BUILD OPTION:** This option focuses on the development of skills in the planning and implementation of landscape projects. Employment opportunities exist with landscape contracting companies, irrigation companies, and retail centers.

**MANAGEMENT OPTION:** This option provides professional education in the management of landscapes. Employment opportunities include positions with landscape management companies and golf courses.

For the B.S. degree in Landscape Contracting, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

**GENERAL EDUCATION:** 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 3-15 credits

**REQUIREMENTS FOR THE MAJOR:** 81-93 credits
(This includes 21-24 credits of General Education courses: 3 credits of GWS courses; 3-6 credits of GA courses; 3 credits of GQ courses; 9 credits of GN courses; 3 credits of GS courses)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 67-68 credits

**PRESCRIBED COURSES** (51 credits)
HORT 410W(3), HORT 468(2)[1], LARCH 060 GA;US;IL(3), MATH 026 GQ(3) (Sem: 1-2)
A S M 217(3), ACCTG 250(3), B A 250(3), B LAW 243(3), CHEM 101 GN(3), ENGL 202D GWS(3), HORT 101 GN(3)[1], HORT 120(2)[1], HORT 131(3)[1], HORT 137(3)[1], HORT 138(3)[1], HORT 408(4)[1] (Sem: 5-6)
SOILS 101 GN(3) (Sem: 7-8)

**ADDITIONAL COURSES** (16-17 credits)
AG BM 101 GS(3), ECON 014 GS(3), ECON 102 GS(3), or ECON 104 GS(3) (Sem: 3-4)
BIOL 110 GN(4) or BIOL 127 GN(3) (Sem: 3-4)
SPAN 001(4) or SPAN 002(4) or SPAN 105(4) (Sem: 3-4)
AG BM 220(3) or MKTG 220(3) (Sem: 5-6)
TURF 100(3) or TURF 235(3) (Sem: 5-6)

**REQUIREMENTS FOR THE OPTION:** 14-26 credits

**DESIGN/BUILD OPTION:** (25-26 credits)

**PRESCRIBED COURSES** (23 credits)
ART 020 GA(3), EDSGN 010(1), HORT 220(3)[1] (Sem: 3-4)
HORT 269(3)[1], HORT 464(4)[1] (Sem: 5-6)
HORT 368(4)[1], HORT 466(5)[1] (Sem: 7-8)

**ADDITIONAL COURSES** (2-3 credits)
Select 2-3 credits from ENT 313(2), ENT 314(1), HORT 238(3), PPEM 300(3) or PPEM 318(2) (Sem: 5-6)

**MANAGEMENT OPTION:** (14-15 credits)

**PRESCRIBED COURSES** (9 credits)
ENT 313(2), ENT 314(1), HORT 238(3)[1], HORT 250(3)[1] (Sem: 7-8)

**ADDITIONAL COURSES** (5-6 credits)
PPEM 300(3) or PPEM 318(2) (Sem: 7-8)
Latin American Studies

*University Park, College of the Liberal Arts (LATAM)*

**PROFESSOR MATTHEW RESTALL, in charge**

This interdisciplinary major is designed for students who want a basic understanding of Latin America. The program is organized so that it may be combined with a second major or a minor subject.

For the B. A. degree in Latin American Studies, a minimum of 121 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

To view the Latin American Studies Minor (LATAM) Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(9-12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of *Bulletin.*)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 21-24 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 40 credits
(This includes 9-12 credits of General Education courses: 6 credits of GH courses; 3-6 credits of GS courses.)

**PRESCRIBED COURSES** (22 credits)
PORT 001(4), SPAN 200(3) (Sem: 1-4)
ANTH 045 GS;US;IL(3), HIST 178 GH;IL(3), HIST 179 GH;IL(3), SPAN 131 GH;US;IL(3) (Sem: 3-6)
PL SC 456(3) (Sem: 5-8)

**ADDITIONAL COURSES** (18 credits)
Select 18 credits from the following:
AAA S/SPAN 132 IL(3), AAA S 200 US(3), ANTH 008 GS;IL(3), ANTH 422(3), ANTH 440(3), CMLIT 405 US;IL(3), ECON 014 GS(3)[2], ECON 102 GS(3), ECON 104 GS(3) (Sem: 3-8)
ECON 333 GS(3), ECON 433(3), HIST 467 US;IL(3), HIST 468 IL(3), PL SC 422(3), PL SC 442(3), PL SC 457(3-6), SPAN 300(3), SPAN 305(3), SPAN 410(3), SPAN 412(3), SPAN 472(3), SPAN 476(3) (Sem: 5-8)
PORT 002(4), PORT 003(4), PORT 405(3), PORT 456(3) (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[2] Choose only one course from ECON 102, ECON 104, or ECON 014.

Law and Society

*University Park, College of the Liberal Arts (LAWSC): offered via World Campus*

**DIANA R. GRUENDLER, Faculty-in-Charge**
The College of the Liberal Arts Law and Society program is an undergraduate major that provides a comprehensive liberal arts education across multiple disciplines. The program focuses on understanding how social, cultural, economic, and political forces treat the law within the context of historical and contemporary trends. Socio-legal theory will provide a framework for understanding the increasing importance of programs that accentuate the study of law, and legal institutions.

The Law and Society program has six prescribed classes. In addition, a student will complete five supporting courses that incorporate the student’s degree goals and can be tailored to his or her special interests. Students will consider the relationship between law, legal processes, human behavior, and legal and social institutions. The conventions of reading, argument, logic, and program solving will be used to explore issues.

Law and Society provides excellent preparation for higher schooling, such as law school or graduate study in sociology, criminology, or criminal justice. The major enhances career options in law enforcement, regulatory agencies, social service agencies, non-profit agencies, non-government agencies (NGO), and organizations that determine public policy. Law and Society also provides valuable knowledge for the small business owner.

For the B.A. degree in Law and Society, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12-15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin)

FIRST-YEAR SEMINAR:
(Included in the ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in the ELECTIVES or GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 30-36 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in front of Bulletin.)

REQUIREMENTS FOR THE MAJOR: 33-36 credits[1]
(This includes 12-15 Credits of General Education courses: 6 credits of GH courses; 0-3 credits of GQ courses; 6 credits of GS courses)

PRESCRIBED COURSES (18 credits)

ADDITIONAL COURSES (3-6 credits)
PHIL 010 GH(3) or PHIL 012 GQ(3); or PHIL 010 GH(3) and PHIL 012 GQ(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (12-15 credits)
Select 12 credits from CAS 404(3), CRIM/SOC 467(3), L A 495(3), L A 496(3), LER 401(3), LER 458Y(3), PL SC 471(3) (Sem: 3-8)
Select 0-3 credits from CAS 321(3), CRIM 100 GS(3), CRIM 113 US(3), L ST 370(3), L A 295(3), L A 296(3), LER 201 GS(3), PHIL 105 GH(3) (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-06-071

Review Date: 04/09/2013

UCA Revision #2: 7/27/07

LA

PROGRAM CURRENTLY ON HOLD at PENN STATE Harrisburg; NOT ACCEPTING NEW STUDENTS

Begin Date of Enrollment Hold: Fall Semester 2015

Letters, Arts, and Sciences

Abington College (LASAB)
Altoona College (LASAL)
Penn State Harrisburg (LASCA)
Letters, Arts, and Sciences is a multi-disciplinary, theme-oriented, and student-designed major leading to a bachelor of arts degree. The major consists of 36 credits, divided into two sections. The core (12 credits) consists of 3 credits each in the following: research methods/projects; communication skills; theory/application; and critical analysis. The additional courses (24 credits) consist of courses directed toward the student's theme, 15 credits of which must be at the 400 level.

In order to be eligible for entrance to the major, the student must submit a proposal. In consultation with an LAS adviser, the student formulates a proposal designing a program that investigates a theme from the viewpoint of at least three different subject areas. Students may not duplicate existing majors from any academic area. An important standard for entrance to the Letters, Arts, and Sciences major is the student's ability to design a program with academic integrity worthy of a bachelor of arts degree.

For the B.A. degree in Letters, Arts, and Sciences, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Early Admission Program for Professional Schools: If a student is accepted and enrolled as a degree candidate in a professional postgraduate degree program requiring three years or more to complete (such as medical school, dental school, law school, theological seminary, etc.) and if the student completes 94 undergraduate credits at Penn State including General Education, B.A. requirements, and the LAS 12-credit core requirements, that student may use up to 30 credits from the professional school to complete the B.A. in LAS.

It must be emphasized that only top students are accepted into professional school programs on such an early admission basis and that not every professional school has such a policy. Students must have enrolled in LAS prior to attending the professional school to request graduation in LAS.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR: 
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES: 
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM: 
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 15 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

ADDITIONAL COURSES (24 credits)
In consultation with adviser, select 24 credits from University-wide offerings to include:
  a) 12 credits at the 400 level representing at least three different subject areas;
  b) a 3 credit 400-level capstone course (to be selected in consultation with adviser);
  c) at least 9 credits (of the 24 total) from the humanities and social sciences. (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
In consultation with adviser, select 3 credits in research methods/projects from courses that involve research methodology or that focus on a research project; select 3 credits in communication skills from courses that focus on expression including those in verbal, symbolic, and written skills; select 3 credits in theory/application from courses that focus on theory, principle, central concepts, or fundamental issues; select 3 credits in critical analysis from courses that focus on evaluation, synthesis, and analysis. (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2008

Blue Sheet Item #: 36-04-042
Review Date: 1/15/08
Reviewed by Publications: 06/23/06
LA

Liberal Arts and Earth and Mineral Sciences Concurrent Degree Program

Liberal Arts and Engineering Concurrent Degree Program
These programs require ten semesters of study, concurrently in the College of the Liberal Arts (during which the student completes 70 credits in General Education and Bachelor of Arts requirements and 33 to 37 basic engineering or science requirements), and in either the College of Earth and Mineral Sciences or the College of Engineering (during which the student completes the credits required in the selected major in Earth and Mineral Sciences or Engineering). Upon completion of the program, the B.A. in General Arts and Sciences will be awarded by the College of the Liberal Arts and the B.S. by the College of Earth and Mineral Sciences or the College of Engineering. The majors available in the College of Earth and Mineral Sciences are Environmental Systems Engineering, Geosciences, Mining Engineering, Polymer Science, Mineral Economics, Petroleum and Natural Gas Engineering, Ceramic Science and Engineering, Metals Science and Engineering, or Meteorology. The majors available in the College of Engineering are Aerospace, Agricultural, Chemical, Civil, Electrical, Environmental, Industrial and Management Systems, Mechanical, or Nuclear Engineering, or Engineering Science.\[44\]

To be eligible for this program, a student must file an application for entrance with the associate dean for undergraduate studies, College of the Liberal Arts, not later than the third semester. Entrance to the program requires that the student satisfy all regular requirements of the College of the Liberal Arts and the College of Earth and Mineral Sciences or the College of Engineering. In addition, special requirements may need to be satisfied when enrollment controls are imposed on programs in any of the colleges because of space limitations. Once a student has met all the requirements for entrance to this program, transfer from the College of the Liberal Arts to the College of Earth and Mineral Sciences or the College of Engineering, with enrollment in one of the majors listed, will be approved automatically at the end of the sixth semester if the student continues to make normal progress toward the concurrent degree and has maintained a cumulative average of 2.00 or higher. Students entering majors in the College of Engineering must complete the following courses with a grade of C or higher: CHEM 110 GN(3) and CHEM 111 GN(1), MATH 140 GQ(4), MATH 141 GQ(4), and PHYS 201 GN(4), and meet the required cumulative grade-point average for the requested engineering major.

Students are advised of the absolute necessity for scheduling classes in exact sequence during the first six semesters of Concurrent Degree study. It is imperative that students obtain, from the Liberal Arts Undergraduate Studies Office, 101 Sparks Building, a copy of the Concurrent Degree requirements worksheet that enumerates the specific course requirements for the two programs for semesters one through six.

_Scheduling Recommendation by Semester Standing given like (Sem:1-2)_

GENERAL EDUCATION: 45 credits  
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description for General Education in this bulletin.)

FIRST-YEAR SEMINAR:  
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:  
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits  
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)  
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 12 credits  
EARTH AND MINERAL SCIENCES OR ENGINEERING COMPONENT: 89-91 credits  
(This includes 15 credits of General Education courses: 6 credits of GQ courses and 9 credits of GN courses.)

SEMESTERS ONE THROUGH SIX (33-34 credits)\[45\]

PRESCRIBED COURSES (27 credits)  
CHEM 111 GN(1), CHEM 113 GN(1), MATH 220 GQ(2-3), MATH 230(4), MATH 250(3) (Sem: 1-4)  
E G 010(1), E G 011(1) (Sem: 3-4)  
PHYS 201 GN(4), PHYS 202 GN(4) (Sem: 3-6)  
E MCH 211(3), E MCH 212(3) (Sem: 5-8)

ADDITIONAL COURSES (6-7 credits)  
PHYS 203 GN(3) or PHYS 204 GN(4) (Sem: 3-6)  
B.S. requirements\[46\](3) (Sem: 5-6)

SEMESTERS SEVEN THROUGH TEN (56-57 credits)  
Credits required in the selected major in Earth and Mineral Sciences or Engineering (56-57) (Sem: 7-10)

SUPPORTING COURSES AND RELATED AREAS (12 credits)  
Select 3 credits from each of the following areas: arts, humanities, science/mathematics, social and behavioral sciences. (Sem: 9-10)

\[44\] Enrollment in the Engineering Science program is limited to those students attaining an average of B or higher during their first six semesters and to those specially chosen by the College of Engineering faculty on the basis of evidence that they will benefit from the advanced courses.

\[45\] Concurrent Degree candidates should consult the individual program requirements in the College of Engineering and the College of Earth and Mineral Sciences to ascertain which combinations of CHEM, E G, E MCH, MATH, and PHYS are required.

\[46\] Concurrent Degree candidates should select a course in this category appropriate for the requirements for their program in either Earth and Mineral Sciences or Engineering.
Management

University Park, Smeal College of Business (MGMT)

PROFESSOR DENNIS GIOIA, Chair, Department of Management and Organization

This major provides students with knowledge and skills managers need to deal with contemporary management challenges, such as leading and motivating people of different ages and backgrounds, developing strategies for competing in the global economy, and balancing the interest of multiple stakeholders in a complex legal, political, and ethical environment. The management core provides a general overview of the knowledge and skills required for effectively managing people and organizations. Students then supplement that overview with either the Human Capital Management concentration or the Organizational Leadership concentration. Career opportunities are in management trainee positions, human capital management, customer service, consulting, and family businesses.

Human Capital Management Concentration - The HCM concentration prepares students for a professional career in human resources management, and develops skills and expertise in areas such as planning, staffing, job design, employee development, performance management, compensation, change management, and managing diversity.

Organizational Leadership Concentration - The Organizational Leadership concentration provides students with knowledge of the attributes, processes, and skills associated with leading organizations in dynamic times. It emphasizes student development of capabilities in leading themselves and others, leading change, and leading strategically in a global economic and social environment.

Entrance Requirement: To be eligible for entrance into the Management (MGMT) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4)[1]; ECON 102 GS(3); SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1]; ENGL 015 GWS(3) or ENGL 030 GWS(3); and MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1]; FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1]. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business Web site (http://www.smeal.psu.edu).

For the B.S. degree in Management, a minimum of 120 credits is required (at least 15 credits must be taken at the 400 level).

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 14 credits

REQUIREMENTS FOR THE MAJOR: 73 credits
(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.)

PRESCRIBED COURSES (46 credits)
ACCTG 211(4)[1], ECON 102 GS(3), FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1] (Sem: 1-4)
B A 342(3), B A 411(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), MIS 204(3), SCM 301(3), MGMT 326(3)[1], MGMT 451W(3)[1], MGMT 471(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (17 credits)
MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1] (Sem: 1-2)
SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1] (Sem: 1-2)

Select 9 credits from one of the following two areas of concentration:

A. Human Capital Management Concentration (9 credits)
MGMT 341(3) (Sem: 5-6)
Select six credits from the following: MGMT 441(3), MGMT 443(3), MGMT 445 US(3) (Sem: 6-8)

B. Organizational Leadership Concentration (9 credits)
MGMT 355(3) (Sem: 5-6)
Select six credits from the following: MGMT 420(3), MGMT 445 US(3), MGMT 461 IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 4 credits: Attainment of 12th-credit-level proficiency in a single foreign language. (4 credits) Proficiency must be demonstrated by either examination or course work (Sem: 1-4)
Select 6 credits of supporting coursework from an approved department list. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015
Dept head update: 6/9/05

BA

Management Information Systems

University Park, Smeal College of Business (M I S)

PROFESSOR JOHN E. TYWORTH, Chair of the Department of Supply Chain and Information Systems

The Management Information Systems major focuses on IT-supported techniques for exploring, analyzing, integrating, and reporting business data to facilitate fact-based decisions and enterprise-wide management. The framework encompasses the concepts, principles, and methods for (1) collecting, transforming, and managing data, (2) doing business analytics, (3) communicating and sharing the results, (4) aligning IT-enabled business analytics with business strategy. Students in this major have the opportunity to take nine credits of supporting work in functional business areas such as accounting, finance, marketing, risk management, and supply chain management. Graduates develop cross-functional literacy in how techniques and technologies help achieve business objectives, along with competency in applying business analytics methods on behalf of the business and in a supporting business area. Thus, graduates are well-prepared for careers in industry, consulting, and government sectors as business analytics professionals.

More information about the broad range of career opportunities is available at http://www.smeal.psu.edu/scis/recruit.

Entrance Requirement: To be eligible for entrance into the Management Information Systems (M I S) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:
1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4)[1]; ECON 102 GS(3); SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1]; ENGL 015 GWS(3) or ENGL 030 GWS(3); and MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1]; FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1]. These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business Web site http://www.smeal.psu.edu.

For the B.S. degree in Management Information Systems, a minimum of 120 credits is required (at least 15 credits must be taken at the 400 level).

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES :
(Included in ELECTIVES or GENERAL EDUCATION selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 14 credits

REQUIREMENTS FOR THE MAJOR: 73 credits
(This includes 12 credits of General Education: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.)

PRESCRIBED COURSES (52 credits)
ACCTG 211(4)[1], ECON 102 GS(3), FIN 301(3)[1], MGMT 301(3)[1], MKTG 301(3)[1] (Sem: 1-4)
MIS 204(3)[1], MIS 301(3)[1], SCM 301(3) (Sem: 3-5)
B A 342(3), B A 411(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), MIS 431(3)[1], MIS 432(3)[1], MIS 446(3)[1],
MIS 479W(3) [Sem: 5-8]

ADDITIONAL COURSES (11 credits)
MATH 110 GQ(4) [Sem: 1-2]
MATH 140 GQ(4) [Sem: 1-2]
SCM 200 GQ(4) [Sem: 1-2]
STAT 200 GQ(4) [Sem: 1-2]
MIS 434(3) [Sem: 6-8]
MIS 441(3) [Sem: 6-8]

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 4 credits: Attainment of 12th-credit-level proficiency in a single foreign language (4 credits). Proficiency must be demonstrated by either examination or course work (Sem: 1-4)
Select 6 credits of supporting coursework. See department list (Sem: 5-8)

A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Lasted Revised by the Department: Spring Semester 2014
Blue Sheet Item #: 42-06-025
Review Date: 04/08/2014
UCA Revision #: 8/9/06

BA

Marketing

University Park, Smeal College of Business (MKTG)

PROFESSOR DUNCAN FONG, Chair of the Department of Marketing

This major provides professional education leading to positions in business, government, and other organizations, and helps prepare the student for advanced study at the graduate level. Career opportunities are in marketing management, sales management, advertising, marketing research, retailing, public policy, and consumer affairs. In addition to following a planned course sequence in general marketing management, the students may elect course work that focuses on their interests in consumer or business-to-business marketing, physical goods or services marketing, retail marketing and for-profit or not-for-profit marketing.

The Marketing major is designed to be integrated with the college's professional education in business and builds on that program and on education in the social sciences.

Entrance Requirement: To be eligible for entrance into the Marketing (MKTG) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy requirements for entrance to the major.

Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4) [Sem: 1-4], ECON 102 GS(3), SCM 200 GQ(4) [Sem: 1-2], FIN 301(3), MGMT 301(3), and MKTG 301(3). These courses must be completed by the end of the semester during which the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business Web site [http://www.smeal.psu.edu](http://www.smeal.psu.edu).

For the B.S. degree in Marketing, a minimum of 120 credits is required with at least 15 credits at the 400 level.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 14 credits

REQUIREMENTS FOR THE MAJOR: 73 credits
(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.)

PRESCRIBED COURSES (46 credits)
ACCTG 211(4), ECON 102 GS(3), FIN 301(3), MGMT 301(3), MKTG 301(3) (Sem: 1-4)
B A 342(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), MIS 204(3), SCM 301(3), MKTG 330(3) [Sem: 5-8]
ADDITIONAL COURSES (17 credits)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)
SCM 200 GQ(4) or STAT 200 GQ(4) (Sem: 1-2)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 4 credits: Attainment of 12th credit level proficiency in a single foreign language. (4 credits) Proficiency must be demonstrated by either examination or course work (Sem: 1-4)
Select 6 credits of supporting course work. See Department List. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-06-027
Review Date: 04/09/2013
UCA Revision #1: 8/9/06

Materials Science and Engineering

University Park, College of Earth and Mineral Sciences (MATSE)

PROFESSOR GARY L. MESSING, Head, Department of Materials Science and Engineering
PROFESSOR R. ALLEN KIMEL, Associate Head of Undergraduate Studies, Materials Science and Engineering

Materials, like ceramics, metals, polymers, and composites, are critical to the growth and success of many industries and key to most engineering disciplines. Graduates of Materials Science and Engineering are employed, or proceed to graduate studies, in many fields such as energy, medicine, sustainability, electronics, communications, transportation, aerospace, defense, and infrastructure industries.

The mission of the department is to provide students with a well-rounded engineering education, with specific emphasis on materials science and engineering in order to meet the needs of industry, academia, and government; to conduct research at the frontiers of the field; and to provide an integrating and leadership role to the broad multidisciplinary materials community.

The integration of knowledge and skills acquired during the course of study in the Materials Science and Engineering program provides graduates with the following student outcomes:

a) Graduates will be able to apply knowledge of mathematics and advanced science and engineering principles to materials systems.

b) Graduates will be able to design and conduct experiments and to analyze and interpret data.

c) Graduates will be able to design a process, a microstructure, or a component to satisfy system needs.

d) Graduates will be able to function on multi-disciplinary teams.

e) Graduates will be able to identify, formulate, and solve engineering problems.

f) Graduates will understand professional and ethical responsibility.

g) Graduates will be able to communicate effectively, both in writing and in speech.

h) Graduates will possess the broad education necessary to understand the impact of engineering solutions in a global and societal context.

i) Graduates will recognize the need for, and be able to engage in, lifelong learning.

j) Graduates will have a knowledge of contemporary issues.

k) Graduates will be able to use the experimental, analytical, statistical, and computational tools for engineering practice in the materials discipline.

l) Graduates will be able to apply the fundamental principles underlying and connecting the structure, processing, properties, and performance of materials systems.

The educational objectives of the undergraduate program are embedded into our mission statement. We will provide and maintain a curriculum that will prepare our recent graduates to accomplish the following Program Educational Objectives:

1. Our graduates provide science and engineering leadership in international industrial, governmental, and academic settings, while serving both their profession and the public.

2. Our graduates are innovators in a wide variety of technical fields including, but not limited to, materials, energy, electronics, medicine, communications, transportation, and recreation.

3. Our graduates excel in careers relating to the entire life cycle of materials, from synthesis and processing, through design and development, to manufacturing, performance, reclamation, and recycling.

4. Our graduates engage in lifelong learning activities which enhance their careers and provide flexibility to respond to changing professional and societal needs.

We achieve these objectives by providing a rigorous but flexible curriculum that allows the student to design their degree in materials science and engineering to achieve their specific academic and professional career interests.

In addition to the cutting edge curriculum, we provide many opportunities to strengthen the student’s undergraduate
studies through research experiences. For example, over 60% of the undergraduates are members of a research group and participate in the extensive materials research programs at Penn State. Further, we provide opportunities for International Internships in Materials, where our students go abroad to perform research at one of the many internationally recognized partner universities in Europe and Asia.

The B.S. degree in Materials Science and Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: 410.347.7700 or www.abet.org.

For the B.S. in Materials Science and Engineering, a minimum of 131 credits is required. This baccalaureate program in Materials Science and Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION 45 credits
(24 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin. Note: The Accreditation Board for Engineering and Technology (ABET) does not permit the use of skills courses to satisfy the Arts category of General Education.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 110 credits
(This includes 24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (79 credits)
MATSE 201(3)[1], MATSE 202(3)[1], MATSE 413 GN(3) (Sem: 3-4)
ENGL 202C GWS(3), MATSE 400(3)[1], MATSE 401(3)[1], MATSE 402(3)[1], MATSE 419(3), MATSE 430(3)[1], MATSE 436(3), MATSE 460(1), MATSE 462(1), MATSE 492W(3)[1] (Sem: 5-6)

ADDITIONAL COURSES (19 credits)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-4)
Select 3 or 6 credits from Synthesis and Processing: MATSE 411(3), MATSE 422(3), MATSE 425(3), MATSE 441(3), MATSE 448(3), MATSE 450(3) (Sem: 6-8)
Select 3 or 6 credits from Structure and Characterization: MATSE 410(3), MATSE 415(3), MATSE 421(3), MATSE 444(3), MATSE 445(3), MATSE 455(3) (Sem: 6-8)
Select 3 or 6 credits from Properties: MATSE 412(3), MATSE 417(3), MATSE 435(3), MATSE 446(3), MATSE 447(3) (Sem: 6-8)
Select 1 credit from Processing Laboratory: MATSE 463(1), MATSE 468(1), MATSE 472(1), MATSE 474(1) (Sem: 7-8)
Select 3 credits from Senior Capstone Experience: MATSE 493W(3) or MATSE 494W(3) (Sem: 7-8)

SUPPORTING COURSE AND RELATED AREAS (12 credits)
Select 12 credits of approved Science or Engineering Elective courses in consultation with advisor (Sem: 6-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[71] The following substitutions are allowed for students attending campuses where the indicated course is not offered:
CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-01-033
Review Date: 08/14/2012
UCA Revision #1: 8/9/06
UCA Revision #2: 7/30/07

EM

Mathematics

Altoona College (MTAAL)
University Park, Eberly College of Science (MTHBA)

PROFESSOR YUXI ZHENG, Chair, Department of Mathematics

Two degrees are offered in mathematics: the Bachelor of Arts and the Bachelor of Science. Both programs have a common core of mathematics courses; both programs prepare students for graduate work in mathematics. In addition, the Bachelor of Arts degree is oriented toward applications of mathematics in the arts and the humanities. The Bachelor of Science degree has a number of options. These options are oriented toward actuarial science, applied and industrial mathematics, computational mathematics, graduate study and systems analysis.

Many of the options are designed for students who want to use mathematics in industry, commerce, or government. In short, the degree requirements have the flexibility to fit many individual interests. The student, with the assistance of a faculty adviser, should select an option by the end of the sophomore year.

In order to be eligible for entrance to the Mathematics major, a student must have: 1) attained at least a 2.00 cumulative

EM
grade point average; and 2) completed MATH 140 GQ(4) and MATH 141 GQ(4) and earned a grade of C or better in each of these courses.

For the B.A. degree in Mathematics, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION or BACHELOR OF ARTS DEGREE REQUIREMENTS course selections)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credit

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 56 credits
(This includes 6 credits of General Education GQ courses.)

PRESCRIBED COURSES: (27-29 credits)
MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], MATH 220 GQ(2-3)[1], MATH 230(4)[1], MATH 311W(3-4)[1], MATH 312(3)[1],
STAT 200 GQ(4) (Sem: 1-4)
MATH 403(3) (Sem: 5-8)

ADDITIONAL COURSES: (18-19 credits)
CMPSC 101 GQ(3) or CMPSC 121 GQ(3) or CMPSC 201 GQ(3) (Sem: 1-2)
MATH 250(3)[1] or MATH 251(4)[1] (Sem: 3-4)
MATH 435(3)[1] or MATH 436(3)[1] (Sem: 5-8)
Select 3 credits[1] from MATH 411(3), MATH 412(3), MATH 417(3), MATH 419(3), or MATH 421(3) (Sem: 5-8)
Select 6 credits[1] of 400-level MATH courses except MATH 401(3), MATH 405(3), MATH 406(3), MATH 441(3), MATH 470(3), MATH 471(4) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS: (8-11 credits)
Select 8-11 credits from department list (Sem: 3-8)

Integrated B.A. in Mathematics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.A. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.A. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.A. in Mathematics and M.A.S. degree, 120 credits are required for the B.A. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.A. and M.A.S. degrees, six of these are at the 500 level: STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3).

Assuming all requirements for the B.A. in Mathematics are completed, students in the program can complete the B.A. degree and not advance to the M.A.S. degree if they desire.

Degree Requirements

IUG Math B.A. students must fulfill the Math B.A. requirement while counting these prescribed Statistics courses (15 credits)
STAT 220(3)*, STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3)
IUG M.A.S. Requirements (30 credits)
STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3), STAT 580(2) and STAT 581(1)**

Electives: (15 credits)
Select from STAT 464(3), STAT 503(3), STAT 504(3), STAT 505(3), STAT 506(3), STAT 507(3), STAT 508(3), STAT 509(3), STAT 510(3) and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

For the IUG B.A. in Mathematics and M.A.S. degree, the four courses: STAT 414(3), STAT 415(3), STAT 501(3) and STAT 502(3) can apply to both the B.A. and M.A.S. degrees.

*Can be waived for students with an equivalent course, e.g. STAT 250 GQ(3) or STAT 301 GQ(3).
** For all students in the M.A.S. program, the STAT 581(1) course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
REQUIREMENTS FOR THE OPTION: 50-51 credits

ACTUARIAL MATHEMATICS OPTION: (50-51 credits)

PRESCRIBED COURSES (30 credits)[1]

ADDITIONAL COURSES (6 credits)[1]
MATH 451(3) or MATH 486(3) (Sem: 5-8)
Select 3 credits from STAT 463 or 400-level MATH courses except MATH 401(3), MATH 405(3), MATH 406(3), MATH 441(3), MATH 470(3), MATH 471(4) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (14-15 credits)
Select 14-15 credits from department list (Sem: 1-8)

APPLIED AND INDUSTRIAL MATHEMATICS OPTION: (50-51 credits)

PRESCRIBED COURSES (21 credits)[1]
MATH 403(3), MATH 412(3), MATH 414(3), MATH 415(3), MATH 436(3), MATH 450(3), MATH 455(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)[1]
Select 12 credits from MATH 411(3), MATH 416(3), MATH 417(3), MATH 419(3), MATH 421(3), MATH 456(3), MATH 461(3), MATH 467(3), MATH 468(3), MATH 479(3), MATH 484(3), MATH 485(3), MATH 486(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (17-18 credits)
Select 17-18 credits from department list (Sem: 1-8)

COMPUTATIONAL MATHEMATICS OPTION: (50-51 credits)

PRESCRIBED COURSES (24 credits)
CMPSC 122(3) (Sem: 3-4)
CMPSC 465(3), MATH 414(3)[1], MATH 415(3)[1], MATH 455(3)[1], MATH 456(3)[1], MATH 467(3)[1], MATH 484(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (9 credits)[1]
Select 3 credits from MATH 411(3), MATH 412(3), or MATH 417(3) (Sem: 5-8)
Select 6 credits from CMPSC 468(3), MATH 310(3), MATH 468(3), or MATH 485(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (17-18 credits)
Select 17-18 credits from department list (Sem: 1-8)

GENERAL MATHEMATICS OPTION: (50-51 credits)

PRESCRIBED COURSE (9 credits)[1]
MATH 403(3), MATH 414(3), MATH 415(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)[1]
MATH 435(3) or MATH 436(3) (Sem: 5-8)
Select 3 credits from MATH 411(3), MATH 412(3), MATH 417(3), MATH 419(3), or MATH 421(3) (Sem: 5-8)
Select 6 credits from 400-level MATH courses except MATH 401(3), MATH 405(3), MATH 406(3), MATH 441(3), MATH 470(3), MATH 471(4) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (29-30 credits)
Select an approved sequence of 12 credits in MATH or a related area or an area of application (Sem: 1-8)
Select 17-18 credits from department list (Sem: 1-8)

GRADUATE STUDY OPTION: (50-51 credits)

PRESCRIBED COURSES (24 credits)[1]
MATH 403(3), MATH 404(3), MATH 414(3), MATH 415(3), MATH 421(3), MATH 429(3), MATH 435(3), MATH 436(3) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)[1]
Select 9 credits of 400-level MATH courses except MATH 401(3), MATH 405(3), MATH 406(3), MATH 441(3), MATH 470(3), MATH 471(4) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (17-18 credits)
Select 17-18 credits from department list (Sem: 1-8)

SYSTEMS ANALYSIS OPTION: (50-51 credits)

PRESCRIBED COURSES (12 credits)[1]
MATH 414(3), MATH 415(3), MATH 436(3), MATH 484(3) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)[1]
Select 6 credits from MATH 310(3), MATH 451(3), MATH 485(3), or MATH 486(3) (Sem: 5-8)
Select 3 credits from 400-level MATH courses except MATH 401(3), MATH 405(3), MATH 406(3), MATH 441(3), MATH 470(3), MATH 471(4) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (29-30 credits)
Select an approved sequence of 12 credits in an area of application; possible areas include business, economics, industrial engineering, social sciences (Sem: 1-8)
Select 17-18 credits from department list (Sem: 1-8)

Integrated B.S. in Mathematics and Master of Applied Statistics (M.A.S.)
The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is
designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process
The number of openings in the integrated B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees, six of these are at the 500 level: STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3).

Assuming all requirements for the B.S. in Mathematics are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. degree if they desire.

Degree Requirements
IUG Math B.S. students must fulfill the Math B.S. requirement while counting these prescribed Statistics courses (15 credits)
STAT 220(3)*, STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3)

IUG M.A.S. Requirements (30 credits)
STAT 414(3), STAT 415(3), STAT 501(3), STAT 502(3), STAT 580(2) and STAT 581(1)**

Electives: (15 credits)
Select from STAT 464(3), STAT 503(3), STAT 504(3), STAT 505(3), STAT 506(3), STAT 507(3), STAT 508(3), STAT 509(3), STAT 510(3) and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

For the IUG B.S. in Mathematics and M.A.S. degree, the four courses: STAT 414(3), STAT 415(3), STAT 501(3) and STAT 502(3) can apply to both the B.S. and M.A.S. degrees.

*Can be waived for students with an equivalent course, e.g. STAT 250 GQ(3) or STAT 301 GQ(3).

** For all students in the M.A.S. program, the STAT 581(1) course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-098
Review Date: 01/10/2012
UCA Revision #1: 8/16/06
UCA Revision #2: 7/30/07

SC

Mechanical Engineering

University Park, College of Engineering (M E)

PROFESSOR KAREN A. THOLE, Head, Department of Mechanical and Nuclear Engineering

Mechanical Engineering is one of the broadest engineering disciplines and is central in many new technological developments. Mechanical engineers create things that help improve the health, happiness and safety of our everyday lives such as biomedical devices, aircraft propulsion, and ways to store renewable energies. Mechanical engineering is divided into two broad areas: mechanical systems and thermal systems. Mechanical systems include the design of mechanisms and the analysis of the strength and wear of materials. Thermal systems include methods of energy conversions, heat transfer and fluid flow.

Program Educational Objectives:
Three to five years after graduation, Mechanical Engineering graduates will be:

1. Working in industry and government including computer-aided design, simulation and analysis of products or systems, experimentation and testing, manufacturing, and technical sales.
2. Assuming increasing levels of responsibility in project, personnel, and budget management.
4. Communicating effectively and recognizing the global, social and ethical contexts of their work.
5. Entering into graduate and professional studies.

Program Outcomes (Student Outcomes):
The Program outcomes are knowledge, skills, and/or behavior that are derived from the program educational objectives.

a. An ability to apply knowledge of mathematics, science, and engineering.
b. An ability to design and conduct experiments, as well as to analyze and interpret data.
c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d. An ability to function on multidisciplinary teams.
e. An ability to identify, formulate, and solve engineering problems.
f. An understanding of professional and ethical responsibility.
g. An ability to communicate effectively.
h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i. A recognition of the need for, and an ability to engage in life-long learning.
j. A knowledge of contemporary issues.
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The program offers a balance of engineering applications and theory with an emphasis on design from the first year through the industry-based capstone design experience in the senior year. In addition, mechanical engineering students find it easy to incorporate co-operative educational experiences as well as many minors into their program.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Mechanical Engineering, a minimum of 131 credits is required. This baccalaureate program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (83 credits)
CHEM 110 GN(3)[1], EDSGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1] (Sem: 1-2)
CMPSC 200 GQ(3), E MCH 211(3)[1], E MCH 212(3)[1], E MCH 213(3)[1], M E 300(3)[1], MATH 220 GQ(2-3), MATH 231(2), MATH 251(4)[1], PHYS 212 GN(4)[1], PHYS 214 GN(2) (Sem: 3-4)
E E 212(3), E MCH 315(2), ENGL 202C GWS(3), M E 320(3)[1], M E 340(3)[1], M E 345(4)[1], M E 360(3)[1], M E 370(3)[1], M E 410(3)[1], MATSE 259(3) (Sem: 5-8)
E I 312(3), M E 450(3)[1] (Sem: 7-8)

ADDITIONAL COURSES (18 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
CHEM 112 GN(3), or BIOL 141 GN(3) (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), ECON 014 GS(3), or ENNEC 100 GS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
M E 440W(3) or M E 441W(3) (Sem: 7-8)
Select 2 credits from M E 325(1), M E 315(1), M E 375(1), M E 355(1), or E MCH 316(1) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits in a 400-level M E Technical Elective course excluding M E 410(3), M E 440W(3), M E 441W(3), M E 450(3), M E 494(1-9), and M E 496(1-18) (Sem: 5-8)
Select 6 credits in Engineering Technical Elective courses, any 400-level courses in the College of Engineering not required for a B.S. in M.E. (Sem: 5-8)
Select 3 credits in General Technical Elective courses from department list (Sem: 7-8)
(Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of GTE and 3 credits of GHA.)
Three rotations of Engr Co-op (ENGR 295, ENGR 395, and ENGR 495) can be used as 3 credits of GTE.)
Integrated B.S. and M.S. in Mechanical Engineering

A limited number of undergraduate students in the B.S.M.E. program will be considered for admission to the integrated undergraduate/graduate program leading to the B.S.M.E. and the M.S.M.E. degrees. Students with a junior standing in the B.S.M.E. degree program may be admitted to the integrated B.S.M.E./M.S.M.E. program, following a positive review of an application specific to this program by the faculty committee on graduate admissions. Students must have attained a GPA of at least 3.0. Students admitted to the integrated program must maintain a GPA in all classes used toward the M.S.M.E. degree of at least 3.0.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Comments
EN

Media Studies

University Park, College of Communications (MEDIA)

PROFESSOR ANTHONY OOLORUNNISOLA, Head, Department of Film-Video and Media Studies

This major is designed for students who want to pursue an academic rather than professional program of media studies. Students are exposed first to the breadth of approaches to understanding the mass media (e.g., aesthetic, cultural, humanistic, social-behavioral) and then, by selecting one of four options, go into depth in a specialized area of media studies. All options within the major are closely intertwined with the liberal arts and sciences. Therefore, students who successfully complete this major must have a strong foundation in the liberal arts and well-developed language and analytical skills. That foundation should include courses such as ART H 100 GA(3), ECON 102 GS(3), HIST 002 GH(3), PSYCH 100 GS(3), and SOC 001 GS(3).

The following four options are offered:

FILM AND TELEVISION STUDIES OPTION: This option is designed for students interested in studying the art, history, and criticism of film and television. Electives offer students the opportunity to pursue a related field, such as art, art history, creative writing, speech communication, or theatre arts. This option merges aesthetics and social sciences and is appropriate for those seeking a more theoretical/critical approach to the study of film and video.

INTERNATIONAL COMMUNICATIONS OPTION: This option is designed for students who want to study the mass media systems of the world and their role in international affairs. The option offers students an opportunity to enhance their occupational opportunities in international business, organizations, or government and to be better prepared to participate in the world community. Students must select either a University-approved minor in a foreign language, area studies, or international studies; a University-approved education abroad program; or other international-related courses or programs with prior departmental approval.

MEDIA EFFECTS OPTION:

This option focuses on the social and psychological effects of media messages and technologies. Students progress through a general introduction to problems and issues, such as the effects of televised sex and violence, to courses that emphasize more theoretical approaches and advanced applications. A minor in a complementary area of study, such as Psychology or Sociology, is encouraged.

SOCIETY AND CULTURE OPTION: In this option, a student and faculty adviser work together to tailor a program of courses to meet the student's individual interest in a coherent theme in media studies. These courses are usually selected in tandem with a minor or other supporting cluster of non-major courses in the area of specialization. Examples of themes include, but are not limited to, communication and the environment, communication and health campaigns, sports and the media, minorities and the media, and gender and the media. A minor in an area of specialization is encouraged.

Students must select at least 80 credits in courses outside the College of Communications, including at least 65 in the liberal arts and sciences.

For the B.A. degree in Media Studies, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)
WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 6-15 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36-45 credits

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 15 credits

PRESCRIBED COURSES (15 credits)
COMM 100 GS(3), COMM 304(3), COMM 405(3), COMM 411(3), COMM 413W(3) (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 21-30 credits

FILM AND TELEVISION STUDIES OPTION: (21 credits)
PRESCRIBED COURSES (9 credits)
COMM 150 GA(3), COMM 242(3), COMM 250 GA(3) (Sem: 3-4)

ADDITIONAL COURSES (12 credits)
Select 9 credits from COMM 451(3), COMM 452(3), COMM 453 IL(3), COMM 454(3), COMM 455(3), COMM 495(1-3), or COMM 496(1-3) (Sem: 5-8)

INTERNATIONAL COMMUNICATIONS OPTION: (21-30 credits)
PRESCRIBED COURSES (9 credits)
COMM 110 GH(3), COMM 410 IL(3), COMM 419 US:IL(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)
Select 3 credits from COMM 118 GS(3), COMM 150 GA(3), COMM 205 US(3), COMM 320(3), COMM 404(3), or COMM 452(3) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (9-18 credits)
Select at least one of the following for a minimum of 9 credits and a maximum of 18 credits, no more than 9 credits in COMM. (Sem: 1-8)
- University approved minor in foreign language, area studies or international studies
- University approved education abroad program
- Other international related courses or programs with prior departmental approval

More than one of the above is strongly recommended.

MEDIA EFFECTS OPTION: (21 credits)
PRESCRIBED COURSES (9 credits)
COMM 118 GS(3), COMM 418(3), PSYCH 100 GS(3)

ADDITIONAL COURSES (9 credits)
Select 6 credits from COMM 110 GH(3), COMM 150 GA(3), COMM 180(3), COMM 205 US(3), COMM 320(3), COMM 403(3) or COMM 412(3) (Sem: 3-4)
Select 3 credits from PSYCH 221 GS(3) or PSYCH 256 GS(3)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits in research methods from an approved department list (Sem: 1-8)

A minor in a complementary area of study is encouraged (e.g. Psychology or Sociology) (Sem: 1-8)

SOCIETY AND CULTURE OPTION: (21 credits)
ADDITIONAL COURSES (21 credits)
Select 6 credits from COMM 110 GH(3), COMM 118 GS(3), COMM 150 GA(3), or COMM 205 US(3) (Sem: 3-4)

A minor in an area of specialization is encouraged.

Integrated B.A./M.A. in Media Studies

The College of Communications offers academically qualified students enrolled in a Bachelor of Arts program in the College of Communications the opportunity to earn both the B.A. and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate Program in Media Studies would facilitate the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars and directed research projects. The program would accelerate and enhance undergraduate students' appreciation for graduate level scholarship by involving them in the seminars, research activities and the scholarly discourse of the College's community of Masters and Doctoral-level scholars.
For the IUG Media Studies B.A./M.A. degree, a minimum of 120 credits are required for the B.A. and 36 credits for the M.A. Twelve graduate level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirements for the Master of Arts degree program in Media Studies, the student will be permitted to receive the BA degree assuming all degree requirements have been satisfactorily completed.

Application Process and Admissions Requirements

Applicants must complete 6 credits from the following lists of courses with a minimum GPA of 3.5 in order to be admitted: 3 credits from COMM 100, COMM 150, COMM 180, COMM 320, or COMM 370 and 3 credits from COMM 205, COMM 250, COMM 381, COMM 401, COMM 403, COMM 404, COMM 405, COMM 407, COMM 408, COMM 409, COMM 410, COMM 411, COMM 413, COMM 417, COMM 418, COMM 419, COMM 451, COMM 452, COMM 453, COMM 454, COMM 455, COMM 484, or COMM 485. The minimum overall GPA required of applicants is 3.2. Admission to the program is based on the evaluation of the student's transcript, examples of completed writing and research projects, a narrative statement of objectives, and two letters of support from faculty with whom they have worked. One faculty member must be from the College of Communications. Students are expected to apply after completing 60 credits but before the completion of 100 credits. Candidates are expected to present records of outstanding scholarly achievement to qualify. Applications will be reviewed by the appropriate subset of members of the Graduate Committee of the College.

Applicants to the integrated program:

1. Must be enrolled in a B.A. program in the College of Communications.
2. Must have completed 60 credits of the undergraduate degree program. (It is recommended that students apply prior to completing 100 credits.)
3. Must provide a narrative statement of objectives and two letters of endorsement from faculty with whom they have worked. One faculty member must be from the College of Communications.
4. Must present an approved plan of study in the application process.

Program of Study

The Integrated B.A./M.A. degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings. The program is specifically not intended for advanced professional education.

Undergraduate tuition rates will apply as long as the student is in undergraduate status, unless the student receives financial support, such as an assistantship requiring the payment of graduate tuition.

Degree Requirements

For the IUG Media Studies M.A. degree, a minimum of 120 credits are required for the B.A. and 36 credits for the M.A. At least 18 of the required 36 credits must be at the 500 level. Twelve graduate level credits, in consultation with the adviser, can apply to both the B.A. and M.A. degrees. Six of these double-counted credits must be at the 500 level. A minimum of 12 credits of coursework, as opposed to research credits, must be completed in Communications. COMM 515 and COMM 506 or COMM 511 are required. IUG students will prepare a thesis proposal in consultation with their advisers and are required to present the final thesis in a formal oral defense meeting to a committee of at least 3 members of the College faculty. It is encouraged that one member of the committee be from outside the College.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012 (MEDIA); Summer Session 2005 (Integrated B.A./M.A.)
Blue Sheet Item #: 40-06-078 (MEDIA); 33-04-161 (Integrated B.A./M.A.)
Review Date: 04/10/2012
UCA Revision #1: 8/20/06
UCA Revision #2: 7/30/07

Department head updated by Publications: 1/16/07

CM

Medieval Studies

University Park, College of the Liberal Arts (MEDVL)

PROFESSOR NORRIS LACY, in charge

This is an interdisciplinary program of study designed to give students an integrated knowledge of medieval civilization. While the main area of study is the fifth to sixteenth centuries in Europe, a global perspective is offered with particular attention to the Near East and the Pacific Rim.

For the B.A. degree in Medieval Studies, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 24 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 30 credits[1]

PRESCRIBED COURSES (6 credits)
MEDVL 107 GH(3) or HIST 107 GH(3), MEDVL 108 GH(3) (Sem: 3-4)

ADDITIONAL COURSES (24 credits)
(A minimum of 12 credits must be in 400-level courses.)
Select 24 credits from the program list of courses dealing with the Middle Ages from no less than three of the following areas:

Art
ART H 201 GA(3) (Sem: 1-8)
ART H 312 GA(3) (Sem: 3-8)
ART H 402(3), ART H 412(3), ART H 422(3-9), ART H 442(3), ART H 452(3) (Sem: 5-8)

History
HIST 105 GH;IL(3), HIST 108 GH;IL(3), HIST 141 GH;IL(3), HIST 165(3) (Sem: 1-8)
HIST 407 IL(3), HIST 408 IL(3), HIST 411(3), HIST 412 IL(3), HIST 413(3), HIST 471W(3), HIST 480 IL(3) (Sem: 5-8)

Literature and Language
CMLIT 001 GH(3), CMLIT 106 GH;IL(3), ENGL 221W(3), GER 175 GH;IL(3), HEBR 010 GH;IL(3), SPAN 130 GH;IL(3) (Sem: 1-8)
FR 351(3), IT 350(3), SPAN 353(3) (Sem: 3-8)
CMLIT 401Y IL(3), CMLIT 408 IL(3), ENGL 441(3), ENGL 442(3), FR 422(3), GER 430 IL(3), GER 431 IL(3), IT 415(3), IT 490(3), LATIN 420(3-6), SPAN 418(3) (Sem: 5-8)

Medieval Studies
MEDVL 187(3) (Sem: 1-2)
MEDVL 197(1-9), MEDVL 199 IL(1-12), MEDVL 294(1-12), MEDVL 299 IL(1-12) (Sem: 1-8)
MEDVL 395(1-18), MEDVL 399 IL(1-12) (Sem: 3-8)
MEDVL 411(3), MEDVL 413(3), MEDVL 494(1-12), MEDVL 496(1-18), MEDVL 497(1-9), MEDVL 499 IL(1-12) (Sem: 5-8)

Philosophy and Religious Studies
RL ST 120 GH(3), PHIL 207 GH(3) (Sem: 1-8)
PHIL 454(3-6), RL ST 420(3) (upon advising) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 1999
Blue Sheet Item #: 27-07-065
Review Date: 4/8/03
LA

Meteorology

University Park, College of Earth and Mineral Sciences (METEO)
PROFESSOR David Stensrud, Head of the Department

Meteorology is a rigorous scientific discipline devoted to the attainment of an increased understanding of the atmosphere and the development of methods for applying that knowledge to practical problems. Although this field is usually associated with weather prediction, it also has significance in environmental, energy, agricultural, oceanic, and hydrological sciences. For students wishing to pursue many of these areas, the department offers several options within the major.

The major requires a solid foundation in mathematics and the physical sciences, and it provides a comprehensive survey of the fundamentals of atmospheric science. It has sufficient flexibility to permit intensive advanced study in such related areas as mathematics, earth sciences, or engineering. The department has particular strengths in weather analysis and prediction, including forecast uncertainty and severe weather; physical meteorology, including radar meteorology, instrumentation and atmospheric measurements; and applied areas, including atmospheric diffusion, air pollution chemistry, dynamic meteorology, tropical meteorology, climate, weather risk, and remote sensing.
Graduating meteorologists are prepared for professional employment with industry, private consulting firms, government, and the armed forces or for further study toward graduate degrees normally required for research, university, or management positions.

The freshman and sophomore years are largely devoted to preparatory work in science, mathematics, and the liberal arts. The junior and senior years involve a core of basic courses in applied and theoretical topics and a choice of courses offering specialized training. The courses unique to each option are normally taken in the junior and senior years.

**Entry to Major Requirements:**

In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Meteorology entrance-to-major requirement must also be completed with a minimum grade of C: MATH 140 GQ(4).

**ATMOSPHERIC SCIENCES OPTION:** This option challenges students to strengthen and broaden their understanding of the physics and chemistry of both the atmosphere and oceans. It helps prepare them for employment in the diverse field of the atmospheric sciences and for graduate study in the atmospheric or related disciplines. Students are encouraged to participate in undergraduate research projects under the supervision of atmospheric and oceanic scientists in the department college.

**ENVIRONMENTAL METEOROLOGY OPTION:** Environmental Meteorology prepares the student for understanding the impact of the weather and climate on the environment, which is to say the impacts of air and water on natural and human-altered ecosystems. In order to do this, the option establishes links between atmospheric physics and a variety of environmental disciplines pertaining to land, water, soils, and plants. Depending on his/her interests, the student will select courses in the Air Quality and Dispersion, Ecology, Environmental Chemistry, Geographic Information Systems or Hydrology.

**GENERAL OPTION:** This option has sufficient flexibility to serve the needs of students who wish to pursue topics chosen broadly from subdisciplines of meteorology or from related areas in consultation with the academic adviser. The General option is appropriate both for students who intend to pursue postgraduate degrees and for students who want to emphasize a topic for which no option exists.

**WEATHER FORECASTING AND COMMUNICATIONS OPTION:** This option prepares students for careers in which their skills as weather forecasters are effectively used in a variety of ways, from science reporting and television broadcasting to web design and computer-based weather graphics production, and developing innovative applications of weather and climate data to industry.

**WEATHER RISK MANAGEMENT OPTION:** The option combines study of meteorology and atmospheric sciences with training in risk, finance, and quantitative decision-making. Weather affects a wide range of industries, including energy, agriculture, insurance, construction, retail, and transport, among others. Weather and climate variation play central roles in the availability of water resources, the spread of disease, and an array of other processes vital for human welfare. There are, consequently, many organizations that confront risks related to weather, and that have a demand for experts who can help them manage these risks. The option in Weather Risk Management is designed for students who wish to work professionally at this intersection of meteorology and risk management.

For a Meteorology course to serve as a prerequisite for any subsequent prescribed or supporting Meteorology course in the major, a grade of C or better must be earned in the prerequisite course.

For the B.S. degree in Meteorology, a minimum of 121 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

**GENERAL EDUCATION:** 45 credits

(23-26 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in front of Bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 6-7 credits

**REQUIREMENTS FOR THE MAJOR:** 93-95 credits

(This includes 23-26 credits of General Education courses: 8 credits of GN courses; 6 credits of GQ courses; 0-3 credits of GS courses; 9 credits of GWS courses.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 66 credits

**PRESCRIBED COURSES** (47 credits)

CHEM 110 GN(3), EM SC 100S GWS(3)[71], MATH 140 GQ(4)[11], MATH 141 GQ(4)[11], PHYS 211 GN(4) (Sem: 1-2)

MATH 251(4), PHYS 212 GN(4) (Sem: 3-4)

METEO 300(4)[11], METEO 411(4)[11], METEO 421(4)[11], METEO 431(3)[11], METEO 440W(3)[11] (Sem: 5-6)

METEO 470(3)[11] (Sem: 6-8)

**ADDITIONAL COURSES** (19 credits)

ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)

METEO 101 GN(3)[11], or METEO 200A(1.5)[11] and METEO 200B(1.5)[11], or METEO 201(3)[11] (Sem: 1-5)

METEO 273(3) or CMPSC 101 GQ(3) or CMPSC 200 GQ(3) or CMPSC 201 GN(3) or CMPSC 202 GQ(3) (Sem: 2-4)

MATH 230(4), or MATH 231(2)[11] and MATH 232(2)[11] (Sem: 3-4)

E B F 472(3) or STAT 301 GQ(3) or STAT 401(3) (Sem: 3-6)

CAS 100 GWS(3) or ENGL 202C GWS(3) (Sem: 3-6)
REQUIREMENTS FOR THE OPTION: 27-29 credits

ATMOSPHERIC SCIENCES OPTION: (27-28 credits)

PRESCRIBED COURSES (3 credits)
METEO 422(3) (Sem: 6-8)

ADDITIONAL COURSES (21-22 credits)
Select 3-6 credits from METEO 473(3)\[1\] and METEO 474(3)\[1\] (Sem: 5-8)
Select 6-9 credits from METEO 436(3)\[1\], METEO 437(3)\[1\], and METEO 454(3)\[1\] (Sem: 5-8)
Select 6-13 credits from METEO 414(4), METEO 434(3), METEO 451(3), METEO 452(3), METEO 455(3), METEO 465(3), METEO 466(3), METEO 471W(3), METEO 477(3), METEO 460W(3) (Up to 9 of these credits in relevant courses in Acoustics, Chemistry, Engineering, Mathematics, and Physics may be substituted with the approval of the student's adviser.) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits of W courses or their equivalent in addition to METEO 440W. (Sem: 7-8)

ENVIRONMENTAL METEOROLOGY OPTION: (27-29 credits)

PRESCRIBED COURSES (9 credits)
C E 370(3), METEO 454(3)\[1\], METEO 455(3) (Sem: 2-8)

ADDITIONAL COURSES (18-20 credits) (May apply to General Education)
Select 3 credits from METEO 473(3)\[1\] or METEO 474(3)\[1\] (Sem: 5-8)

GENERAL OPTION: (27 credits)

ADDITIONAL COURSES (6 credits)
Select 3 credits from METEO 436(3)\[1\] or METEO 437(3)\[1\] or METEO 454(3)\[1\] (Sem: 5-8)
Select 3 credits from METEO 473(3)\[1\] or METEO 474(3)\[1\] (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 21 credits in consultation with advisor from 400-level METEO courses and/or 300-, or 400-level courses from the Colleges of Agricultural Sciences, Earth and Mineral Sciences, Engineering, and/or Science. With the approval of a meteorology adviser, some 200-level courses from those Colleges may also be used. (Sem: 7-8)

WEATHER FORECASTING AND COMMUNICATIONS OPTION: (28 credits)

PRESCRIBED COURSES (13 credits)
METEO 481(3), METEO 482(3) (Sem: 5-6)
METEO 414(4), METEO 415(3) (Sem: 6-8)

ADDITIONAL COURSES (15 credits)
Select 3 credits from METEO 436(3)\[1\] or METEO 437(3)\[1\] (Sem: 5-8)
Select 3-6 credits from METEO 473(3)\[1\] or METEO 474(3)\[1\] (Sem: 5-8)
Select 6-9 credits from CAS 211(3), E E 477(3) or METEO 477(3), ENGL 416(3), GEOG 333(3), GEOG 361(3), GEOG 362(3), GEOG 417(3), GEOG 467(3), GEOG 402Y IL(3), METEO 413(3), METEO 414(3), METEO 418W(3), METEO 419(3), METEO 422(3), METEO 434(3), METEO 451(3), METEO 452(3), METEO 454(3), METEO 471W(3), METEO 483(3), METEO 486(1-2, max 3), any two from METEO 495A(3), METEO 495B(3), METEO 495C(3), METEO 495D(3) or METEO 495E(3) (Sem: 5-8)

WEATHER RISK MANAGEMENT OPTION: (27 credits)

PRESCRIBED COURSES (9 credits)
ECON 102 GS(3) (Sem: 1-2)
E B F 473(3) (Sem: 3-6)
METEO 480(3) (Sem: 7-8)

ADDITIONAL COURSES (18 credits)
Select 6 credits from METEO 415(3), METEO 473(3)\[1\] or METEO 474(3)\[1\] (Sem: 5-8)
Select 6-9 credits from METEO 436(3)\[1\], METEO 437(3)\[1\] or METEO 454(3)\[1\]** (Sem: 5-8)
Select 6 credits from E B F 301(3); E B F 483(3), E B F 484(3); EGEE 437(3); EGEE 438(3); or EME 460(3) (Sem: 6-8)
Select 3 credits from ECON 490(3), STAT 318(3), STAT 319(3), STAT 414(3), STAT 415(3), STAT 460(3) or STAT 462(3) (Sem: 6-8)

**Preferred choice

Integrated B.S./M.S. Program in Meteorology

The Department of Meteorology offers an integrated B.S./M.S. (IUG) Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Meteorology in five years of study. In order to complete the program in five years, students interested in the Integrated B.S./M.S. Program in Meteorology must apply for admission to the Graduate School and the Integrated B.S./M.S. Program by the end of their junior year.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Atmospheric Sciences or the General option (see the Undergraduate Bulletin). Students who intend to enter the Integrated B.S./M.S. program are encouraged to take upper level classes during their first three years whenever appropriate. By the end of the junior year, students normally apply for admission to both the IUG program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the
selected B.S. Meteorology option, with an emphasis on completing 500-level course work as appropriate. During the
senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S.
degree in Meteorology. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree
requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or
Atmospheric Sciences options are given on the departmental Web site http://www.met.psu.edu. Undergraduate tuition
rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, via
an assistantship requiring the payment of graduate tuition.

Admission Requirements

Students who wish to complete the Integrated B.S./M.S. Program in Meteorology should apply for admission to both the
Graduate School and the Integrated B.S./M.S. Program by no later than the end of their junior year. In this case, successful
students will be admitted formally into the graduate program in Meteorology just prior to their senior year, if their
progress has been satisfactory. Admission prior to the senior year is also possible in some unusual circumstances. In all
cases, admission to the program will be at the discretion of the Graduate Admissions Officer for the Department of
Meteorology, who will determine the necessary criteria for all applicants. These criteria include the setting of the minimum
required scores on the GRE and the minimum cumulative GPA for consideration, the receipt of sufficiently strong
recommendation letters from three faculty and a strong letter of support from the department head, and the writing of an
excellent proposal for a workable research project with a specific adviser; normally, evidence of significant research
progress must be provided in the application as well.

The details of the program requirements can be found in the Graduate Degree Programs Bulletin.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[7] The following substitutions are allowed for students attending campuses where the indicated courses is not offered:
CAS 100 GWS or ENGL 202C GWS can be substituted for EM SC 100S GWS.

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-029A

Review Date: 11/17/2015

UCA Revision #1: 8/9/06

UCA Revision #2: 7/30/07

Comments

Microbiology

University Park, Eberly College of Science (MICRB)

PROFESSOR Wendy Hanna-Rose, in charge

Microbiology is the science of the "simple" forms of life and of the response of more complex life forms to their presence
and activities. Students in the Microbiology major will (1) complete a comprehensive study of life processes at the
molecular and cellular level, with particular emphasis on prokaryotes, and (2) perform basic and advanced techniques in
laboratory methodology. Through advanced course study, the many subdisciplines of microbiology such as molecular
genetics, immunology, and virology may be explored more fully. Ample opportunities exist for participation in
faculty-initiated research projects. Extensive laboratory experience is a particular strength of the major. Courses in such
applied areas as industrial, medical, and food microbiology help prepare students for careers in the pharmaceutical,
biotechnical, and agricultural industries.

In order to be eligible for entrance to the Microbiology major, a student must have: (1) attained at least a 2.00 cumulative
grade-point average and (2) completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), and MATH 140 GQ(4) and
earned a grade of C or better in each of these courses.

For the B.S. degree in Microbiology, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 95 credits[86]
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

PRESCRIBED COURSES (64 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1)[1], CHEM 112 GN(3)[1], CHEM 113 GN(1), MATH 140 GQ(4)[1], MATH 141 GQ(4),
PSU 016(1) (Sem: T-2)
PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 1-4)
B M B 442(3), BIOL 322(3), CHEM 210(3), CHEM 212(3), CHEM 213(2), MICRB 201(3)[85], MICRB 202(2), MICRB 251(3)[85],
MICRB 252(3)[85] (Sem: 3-4)
B M B 400(2), B M B 401(3), B M B 402(3), MICRB 421W(3) (Sem: 5-6)
B M B 428(3) (Sem: 5-8)

ADDITIONAL COURSES (21-23 credits)
Select any four of the following: MICRB 401(3), MICRB 410(3), MICRB 412(3), MICRB 415(3), or MICRB 450(2) (Sem: 5-6)
Select 3 credits from B M B 445W(2), B M B 448(2), MICRB 422(2), MICRB 447(1) (Sem: 5-8)
Select 6-7 credits from FD SC 408(2), B M B 488(2), B M B 496(1-18) or any other MICRB 400-level course, with a total maximum of 4 credits in B M B 488 and/or B M B 496 (1-18) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9-11 credits)
Select 9-11 credits from department list (Sem: 5-8)

Note: A student enrolled in an ROTC program may, after consultation with the head of the microbiology program, substitute up to 6 credits of ROTC in the categories of Additional Courses and Supporting Courses and Related Areas.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[85] To graduate, a grade of C or better is required in two of the following courses: MICRB 201, B M B/MICRB 251, B M B/MICRB 252.
[86] To graduate, a grade of C or better is required in 9 credits of any B M B, or MICRB 400-level course except B M B 443W, B M B 445W, B M B 448, B M B 488, B M B 496, MICRB 421W, MICRB 422, MICRB 442, MICRB 447.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 42-01-112
Review Date: 08/20/13
UCA Revision #1: 8/9/06

SC

Mining Engineering

University Park, College of Earth and Mineral Sciences (MNG E)

PROFESSOR JEFFERY L. KOHLER, Undergraduate Program Chair

Mining contributes to nearly 15% of the U.S. and 25% of the global economy. Mined products are significant and critical inputs to food production, manufacturing, construction, and electricity supply, and each year every person in the U.S. requires an average of 38,500 pounds of new minerals to equip and power their day-to-day activities. Over 14,000 mines distributed throughout the U.S. supply the majority of these mined products.

The Penn State Mining Engineering Program prepares students for a career in the industrial minerals, metals, and energy industries that sustain the domestic and global economies. Importantly, the Program provides an emphasis on sustainable mining through integration of environmental, safety and health, and societal responsibility principles in the design and operation of mineral enterprises.

Graduates of the program will be prepared to work domestically or internationally to develop and operate mines; or to work in supporting activities including engineering consulting, banking, equipment development and supply, regulatory enforcement, and research. This is accomplished primarily through the curriculum, but is enhanced by an internship program, which allows qualified students to obtain practical experience through structured employment opportunities in the private and public sectors.

The curriculum is built on the foundation of mathematics, science, and general education common to engineering majors at Penn State. The courses specific to this major are designed and sequenced to provide an appropriate blend of theory, application, and design. The required courses help to provide the enabling skills for graduates to work in any facet of the vast minerals industry, and technical electives allow for in-depth study of more specialized topics. The general education opportunities are sufficiently broad and diverse in nature and scope to enable the student to tailor the educational experience to particular interests, backgrounds, and expected roles in society.

The integration of knowledge and skills acquired during the course of study in the Mining Engineering program provides graduates with the following student outcomes:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs
4. An ability to function on multi-disciplinary teams
5. An ability to identify, formulate, and solve engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in a global and societal context
9. A recognition of the need for and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

PROGRAM EDUCATIONAL OBJECTIVES

1. Within three-to-five years after graduation, students are expected to be advancing in their career in the minerals industry and adapting to new situations and emerging problems, through the application of general engineering-science skills and the core technical problem-solving and design practices of the mining engineering profession, with an understanding of the need for lifelong learning.
2. Within three-to-five years after graduation, students are expected to be communicating effectively.
3. Within three-to-five years after graduation, students are expected to be functioning effectively as individuals or as members of teams.
Within the first year after graduation, students are expected to demonstrate an understanding of the importance of mining to society, and for working in a contemporary society in which safety and health, responsibility to the environment, and ethical behavior are required, without exception.

Within the first five years after graduation, students are expected to be preparing to attain licensure as a Professional Engineer.

STUDENT-TRAINEE PROGRAM: An internship program and a five-year work-study plan are available to incoming students in Mining Engineering. Numerous mining and manufacturing companies, as well as government agencies, cooperate with the University to offer structured employment opportunities during the student’s academic career. In addition to earning significant funds to help finance their education, these opportunities provide valuable practical and professional experience prior to graduation. The internships normally take place in the summer, and the B.S. degree can be earned in four years. The work-study plan consists of alternating six-month periods of employment and schooling, and requires five years to earn the B.S. degree. Additional information can be obtained from the department.

Integrated B.S. in Mining Engineering (MNG E) and M.S. in Energy and Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Mining Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused MNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements.

For the B.S. in Mining Engineering, a minimum of 131 credits is required. This baccalaureate program in Mining Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 6 credits of GWS courses; 3 credits of GH courses.)

PRESCRIBED COURSES (84 credits)
CHEM 110 GN(3), CHEM 111 GN(1), EM SC 100S GWS(3)[88] (Sem: 1-2)
ECON 102 GS(3), EDGSN 100(3) (Sem: 1-4)
MATH 140 GQ(4), MATH 141 GQ(4), MATH 250(3), STAT 301 GQ(3) (Sem: 1-6)
E MCH 210(5), GEOSC 001(3)[1], PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2) (Sem: 3-4)
E E 211(3), MNG 230(3)[1], MNG 331(3), MNG 422(3), (Sem: 3-8)
EME 460(3), MN PR 301(3)[1], MN PR 413(1)[1], MNG 404(2), (Sem: 5-6)
GEOG 201(4), MNG 223(2), MNG 410(3), MNG 411(2), MNG 441(3)[1], MNG 451W(4)[1] (Sem: 5-8)

ADDITIONAL COURSES (23 credits)
Select 23 credits, one course from each category a, b, c, d, e, f, g, or h:

a. ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
b. PHIL 103 GH(3) or PHIL 104 GH(3)
c. CMPSC 201 GQ(3) or CMPSC 202 GQ(3)
d. MATH 220 GQ(2) or MATH 231(2) (Sem: 3-4)
e. E MCH 212(3) or E MCH 212H(3) (Sem: 3-4)
f. EME 301(3) or EME 302(3) (Sem: 4-6)
g. EME 303(3) or EME 360(3) (Sem: 5-6)
h. MNG 470(3) or GEOG 470W(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with adviser (Students may apply 6 credits of ROTC.) (Sem: 5-8)

Course Substitutions for the Integrated B.S. in Mining Engineering (MNG E) and M.S. in Energy and Mineral Engineering (EME)

As many as twelve of the credits required for the master's degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[88] The following substitutions are allowed for students attending campuses where the indicated course is not offered:
Music

University Park, College of Arts and Architecture (MUSBA)

PROFESSOR SUE HAUG, Director, School of Music

The Bachelor of Arts degree in Music combines a broad liberal education with a selection of courses in Music. The degree is designed to develop basic musicianship, the ability to perform, and a set of principles that leads to a fuller intellectual grasp of the art.

The B.A. in Music degree program includes a General Music Studies Option and an additional option in Music Technology.

Students are required to pass a piano proficiency examination, enroll in a core ensemble for two semesters, and satisfactorily complete a senior project. Application for admittance into the program requires completion of a two-year core of music and General Education courses.

For the B.A. degree in Music, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(1-21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in the REQUIREMENTS FOR THE MAJOR, ELECTIVE, or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credit

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 51-74 credits[1]
(This includes 1-21 credits of General Education courses - General Music Studies Option: 1-3 credits of GA courses; Music Technology Option: 6 credits of GA courses, 6 credits of GQ courses, 9 credits of GN courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 38 credits

PRESCRIBED COURSES (28 credits)
MUSIC 119S(2), MUSIC 121(1), MUSIC 122(1), MUSIC 131(2), MUSIC 132(2), MUSIC 162 IL(2) (Sem: 1-2)
MUSIC 221(1), MUSIC 222(1), MUSIC 231(2), MUSIC 261 GA;IL(3), MUSIC 262 GA;IL(3), MUSIC 331(2) (Sem: 3-4)
MUSIC 332(2) (Sem: 5-6)
MUSIC 101(1), MUSIC 476W(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 6 credits in applied music through Level IV of Primary (Sem: 1-8)
Select 4 credits of ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

REQUIREMENTS FOR THE OPTION: 13-36 credits

GENERAL MUSIC STUDIES OPTION: (13-15 credits)

ADDITIONAL COURSES (1-3 credits)
INART 258A GA(3) or INART 258B GA(1) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits of 400-level music courses (see School of Music Handbook for specific requirements) (Sem: 5-8)

MUSIC TECHNOLOGY OPTION (34-36 credits)

PRESCRIBED COURSES (28 credits)
INART 258A GA(3), INART 050 GN(5), MATH 140 GQ(4), MATH 220 GQ(2), MUSIC 434 GA(3) (Sem: 1-6)
MUSIC 453(1) (Sem: 3-4)
MUSIC 452(3), MUSIC 458(3), THEA 484(3) (Sem: 5-6)
MUSIC 451(3) (Sem: 7-8)
Integrated B.A. in Music - M.A. in Music Theory

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and the Master of Arts in Music Theory in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the undergraduate thesis with the master's thesis thereby achieving a greater depth of inquiry.

Application Process

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

- 4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
- 4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
- 3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

Reduced Course Load

As many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

B.A. Senior Project (Music 476W) / M.A. Thesis (Music 600)

Students will be encouraged to select a B.A. Senior Project topic (Music 476W) that will later develop into the M.A. Thesis. It is expected that the Master's Thesis consist of greater depth and specialization than the Senior Project.

Eligibility for a Graduate Assistantship

Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

Integrated B.A. in Music - M.A. in Music Theory and History

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and the Master of Arts in Music Theory and History in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the undergraduate thesis with the master's thesis thereby achieving a greater depth of inquiry.

Application Process

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

- 4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
- 4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
- 3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

Reduced Course Load

As many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

B.A. Senior Project (Music 476W) / M.A. Thesis (Music 600)

Students will be encouraged to select a B.A. Senior Project topic (Music 476W) that will later develop into the M.A. Thesis. It is expected that the Master's Thesis consist of greater depth and specialization than the Senior Project.

Eligibility for a Graduate Assistantship

Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

Integrated B.A. in Music - M.A. in Musicology

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Arts in Music the opportunity to enroll in an integrated program leading to both the B.A. in Music and the Master of Arts in Musicology in a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the
two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years. In particular, the program encourages the student to integrate the undergraduate thesis with the master's thesis thereby achieving a greater depth of inquiry.

Application Process

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before the end of the sixth semester. For acceptance into the program students must successfully complete the following courses or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

Reduced Course Load
As many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted.

B.A. Senior Project (Music 476W) / M.A. Thesis (Music 600)

Students will be encouraged to select a B.A. Senior Project topic (Music 476W) that will later develop into the M.A. Thesis. It is expected that the Master's Thesis consist of greater depth and specialization than the Senior Project.

Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
ADDITIONAL COURSES (6 credits)
Select 6 credits from MUSIC 461W(3), MUSIC 462W(3), MUSIC 463W(3), MUSIC 464W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (4 credits)
Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

REQUIREMENTS FOR THE OPTION: 47-56 credits

COMPOSITION OPTION: (47-49 credits)

PRESCRIBED COURSES (34-36 credits)
INART 258A GA(3), MUSIC 173S(2), MUSIC 174J(2) (Sem: 1-2)
MUSIC 273J(2), MUSIC 274J(2) (Sem: 3-4)
MUSIC 336(2), MUSIC 373J(3), MUSIC 374J(3), MUSIC 458(3), MUSIC 472(2) (Sem: 5-6)
MUSIC 431(2-3), MUSIC 433(2-3), MUSIC 473J(3), MUSIC 474J(3) (Sem: 7-8)

ADDITIONAL COURSES (13 credits)
Select 11 credits of Applied MUSIC courses (Sem: 1-7)
Select 2 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)

KEYBOARD INSTRUMENTS OPTION: (48-53 credits)

PRESCRIBED COURSES (6 credits)
MUSIC 129S(3) (Sem: 1)
MUSIC 481(3) (Sem: 5-7)

ADDITIONAL COURSES (3-6 credits)
INART 258A GA(3) or 258B GA(1) (Sem: 3-6)
Select 2-3 credits from MUSIC 181(2), MUSIC 182(2), MUSIC 267(2), MUSIC 336(2), MUSIC 422(3), MUSIC 431(2-3), MUSIC 432(2-3), MUSIC 433(2-3), MUSIC 438(2), MUSIC 472(2) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (39-41 credits)
Select 4 credits in a secondary instrument (Sem: 1-8)
Select 4-6 credits in music in consultation with advisor (Students may apply 2 credits of ROTC.) (Sem: 1-8)
Select 21 credits in applied music through Level VIII of performance (Sem: 2-8)
Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 5-8)
Select 2 credits from MUSIC 419(2) or MUSIC 424(2) (Sem: 5-8)

STRINGS, WINDS, BRASS AND PERCUSSION INSTRUMENTS OPTION: (47-52 credits)

PRESCRIBED COURSES (3 credits)
MUSIC 129S(3) (Sem: 1)

ADDITIONAL COURSES (9-12 credits)
(MUSIC 336 and MUSIC 422 may fulfill the requirement of Additional Courses or Supporting Courses and Related Areas in the option, but not both.)
Select 2 credits from MUSIC 086(1), MUSIC 087(1), MUSIC 181(2), MUSIC 190(1), MUSIC 191(1), MUSIC 192(1), MUSIC 336(2), MUSIC 422(3), MUSIC 421(1), MUSIC 422(3), MUSIC 466(2), MUSIC 485(3), MUSIC 487(3) (Sem: 1-8)
INART 258A GA(3) or INART 258B GA(1) (Sem: 3-6)
Select 2-3 credits from MUSIC 181(2), MUSIC 182(2), MUSIC 267(2), MUSIC 336(2), MUSIC 422(3), MUSIC 431(2-3), MUSIC 432(2-3), MUSIC 433(2-3), MUSIC 438(2), MUSIC 472(2) (Sem: 5-8)
Select 1 credit from MUSIC 414(1-2), MUSIC 415(1-2), MUSIC 416(1-2), or MUSIC 417(1-2) (Sem: 5-8)
Select 3 credits from MUSIC 485(3) or MUSIC 487(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (35-37 credits)
Select 4 credits in a secondary instrument (Sem: 1-8)
Select 4 credits in music in consultation with advisor (Students may apply 4 credits of ROTC.) (Sem: 1-8)
Select 21 credits in applied music through Level VIII of performance (Sem: 2-8)
Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 5-8)

VOICE OPTION: (51-56 credits)

PRESCRIBED COURSES (8 credits)
MUSIC 129S(3) (Sem: 1)
MUSIC 367(1), MUSIC 388(1), MUSIC 389(1) (Sem: 1-8)
MUSIC 418(2) (Sem: 7)

ADDITIONAL COURSES (3-6 credits)
INART 258A GA(3) or 258B GA(1) (Sem: 3-6)
Select 2-3 credits from MUSIC 181(2), MUSIC 182(2), MUSIC 267(2), MUSIC 336(2), MUSIC 422(3), MUSIC 431(2-3), MUSIC 432(2-3), MUSIC 433(2-3), MUSIC 438(2), or MUSIC 472(2) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (40-42 credits)
Select 3-5 credits in consultation with advisor (Students may apply 2 credits of ROTC.) (Sem: 1-8)
Select 4 credits in a foreign language: French, German or Italian (Sem: 1-8)
Select 4 credits in a secondary instrument (Sem: 1-8)
Select 21 credits in applied music through Level VIII of performance (Sem: 2-8)
Select 4 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 5-8)

Integrated B.M. in Performance - M.A. in Music Theory

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Music the opportunity to enroll in an integrated program leading to both the B.M. in Performance and the Master of Arts in Theory in
a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the
two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are
pursued sequentially and to earn the two degrees in five years.

**Application Process**

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and
statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will
prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before
the end of the sixth semester. For acceptance into the program students must successfully complete the following courses
or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

**Reduced Course Load**

As many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate
degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis
credits may not be double counted.

**Eligibility for a Graduate Assistantship**

Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

**Tuition Charges**

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial
support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for
Establishing Integrated Undergraduate - Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

**Integrated B.M. in Performance - M.A. in Music Theory and History**

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Music the
opportunity to enroll in an integrated program leading to both the B.M. in Performance and the Master of Arts in Music
Theory as a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years.

**Application Process**

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and
statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will
prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before
the end of the sixth semester. For acceptance into the program students must successfully complete the following courses
or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

**Reduced Course Load**

As many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate
degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis

**Integrated B.M. in Performance - M.A. in Musicology**

The School of Music offers a limited number of academically superior students enrolled in the Bachelor of Music the
opportunity to enroll in an integrated program leading to both the B.M. in Performance and the Master of Arts in Music
Theory as a continuous program of study culminating in both degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially and to earn the two degrees in five years.

**Application Process**

To initiate the application process, students must submit a transcript, faculty recommendation, writing sample, and
statement of goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will
prepare them for acceptance into the IUG program. Normally a student would apply after the fourth semester and before
the end of the sixth semester. For acceptance into the program students must successfully complete the following courses
or their equivalent with a minimum average of 3.5 in their music courses, and a minimum GPA of 3.0.

4 semesters of music theory (MUSIC 131, MUSIC 132, MUSIC 231, MUSIC 331)
4 semesters of musicianship (MUSIC 121, MUSIC 122, MUSIC 221, MUSIC 222)
3 semesters of music history (MUSIC 162, MUSIC 261, MUSIC 262)

**Reduced Course Load**

As many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate
degree programs. A minimum of 50% of the courses proposed to count for both degrees must be at the 500 level. Thesis
Eligibility for a Graduate Assistantship
Students in the IUG program will be eligible for a graduate assistantship starting in the beginning of the fifth year.

Tuition Charges
Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student received financial support, for example, an assistantship requiring the payment of graduate tuition (from "Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs" - approved by the Graduate Council, May 8, 1996).

[A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[1] Last Revised by the Department: Fall Semester 2011 (MUSBM); Fall Semester 2002 (Integrated Programs)
Blue Sheet Item # 40-01-016 (MUSBM); 30-07-037, 30-07-039, 30-07-041 (Integrated Programs)
Review Date: 08/16/2011
Director name last updated: 01/13/06

Music Education

University Park, College of Arts and Architecture (MU ED)

PROFESSOR SUE HAUG, Director, School of Music

The Bachelor of Music Education (B.M.E.) degree is a professional program that helps prepare students for teaching in elementary and secondary schools. Students are expected to meet all requirements for Entrance to Teacher Education Program in Music, must pass the piano proficiency, complete all music courses, SPLED 400 and SPLED 403A or 403B, prior to student teaching. Graduates of this program are prepared to receive the Pennsylvania Instructional I certificate for teaching music K-12. (See also Teacher Education Programs.)

The goal of the Penn State Music Teacher Education Program is to prepare exemplary music teachers for K-12 music programs. Such individuals can provide outstanding personal and musical models for children and youth and have a firm foundation in pedagogy on which to build music teaching skills. Penn State B.M.E. graduates exhibit excellence in music teaching as personal and musical models as well as emerging pedagogues.

All candidates seeking entrance to the Bachelor of Music Education (B.M.E.) must meet the following entrance to major criteria:

1. Minimum 3.00 cumulative GPA by the end of the semester prior to ETM semester and at least 48 credits completed by the end of the semester prior to ETM semester.
2. Either qualifying scores from the PECT PAPA for Reading, Writing and Mathematics; qualifying Scholastic Achievement Test scores for the combined and individual Critical Reading, Writing, and Mathematics sections; or qualifying American College Test Plus Writing composite and individual English/Writing score and Math score as specified by the Pennsylvania Department of Education.
3. Complete 6 credits in quantification (GQ) ("C" or higher required).
4. Complete 3 credits in literature (GH) ("C" or higher required).
5. Complete ENGL 015 or ENGL 030 ("C" or higher required).
6. Complete early field experience ("C" or higher required).
   Course List: MUSIC 295A
7. Complete EDPSY 010 and 3 additional credits of the education core ("C" or higher required).
   Course List: EDPSY 010, PSYCH 100, HD FS 229, HD FS 239
8. Complete 15 credits of required courses in teaching area ("C" or higher required).
   Course List: MUSIC 112, 151, 153, 154, 162, 216, 222, 261, 262, 331.
9. Complete primary level IV on applied instrument ("C" or higher required)
10. Complete and document a minimum of 80 hours of paid or volunteer work with age-appropriate population. At least 40 hours of these age-appropriate 80 hours would be satisfied by working with "under-represented learners."
11. Complete additional requirements: Voice Requirement (MUSIC 116 or VOICE 270J), Piano Requirement (MUSIC 270 or KEYBD 270J), and Percussion Requirement (MUSIC 152 or PERCN 270J) ("C" or higher required).
12. Approval from the professional education adviser or the head of the pertinent certification program.

For the B.M.E., a minimum of 139 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)
GENERAL EDUCATION: 45 credits
(10-12 of these credits are included in the REQUIREMENTS FOR THE MAJOR. 18 of these credits are required for Entrance to Teacher Certification. See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 104-106 credits[1]
(This includes 10-12 credits of General Education - 6 credits of GS, 1-3 credits of GA, and 3 credits of GH)

PRESCRIBED COURSES (49 credits)
MUSIC 040S(1), MUSIC 121(1), MUSIC 122(1), MUSIC 131(2), MUSIC 132(2), MUSIC 162 IL(2) (Sem: 1-6)
MUSIC 112(5), MUSIC 151(1), MUSIC 153(1), MUSIC 154(1), MUSIC 216(5), MUSIC 221(1), MUSIC 222(1), MUSIC 231(2),
MUSIC 251 IL(3), MUSIC 262 IL(3), MUSIC 266(1), MUSIC 295A(1), MUSIC 331(2), MUSIC 366(1) (Sem: 3-4)
CI 280 GH(3), EDPSY 010 GS(3), MUSIC 332(2), MUSIC 340(2), MUSIC 341(2), MUSIC 345(2), MUSIC 395A(1), MUSIC
395B(1), SPLED 400(4) (Sem: 5-6)
MUSIC 101(1) (Sem: 7)

ADDITIONAL COURSES (45-47 credits)
Select 1-3 credits from INART 258A GA(3) or INART 258B GA(1) (Sem: 1-2)
Select 7 credits of ensembles as follows: MUSIC 076(1), MUSIC 077 GA(1), MUSIC 078 GA(1), MUSIC 080 GA(1), MUSIC 081
GA(1), MUSIC 082 GA(1), MUSIC 084 GA(1), MUSIC 086 GA(1), MUSIC 087 GA(1), MUSIC 089 GA(1), MUSIC 090 GA(1),
MUSIC 091 GA(1), MUSIC 092 GA(1), MUSIC 093 GA;US;IL(1), MUSIC 094 GA(1), MUSIC 103 GA(1), MUSIC 104 GA(1),
MUSIC 190 GA(1), MUSIC 191 GA(1), MUSIC 192 GA(1), MUSIC 193(1), MUSIC 194(1) (Sem: 1-7)
Select 14 credits in applied music through Primary Level VII (Sem: 1-7)
Select 3 credits from HD FS 229 GS(3), HD FS 239 GS(3) or PSYCH 100 GS(3) (Sem: 1-4)
Select 3 credits from SPLED 403A(3) or SPLED 403B(3) (Sem: 6-7)
Select 2 credits from MUSIC 181(2), MUSIC 267(2) (Sem: 5-6)
Select 3 credits from MUSIC 441W(3), MUSIC 444W(3), MUSIC 445W(3), MUSIC 446W(3) (Sem: 7)
Select 12 credits from MUSIC 495A, MUSIC 495B, MUSIC 495C, as follows:
- 5 or 7 credits of MUSIC 495A (Sem: 8)
- 5 or 7 credits of MUSIC 495B or MUSIC 495C (Sem: 8)

SUPPORTING COURSES AND RELATED AREAS (10 credits)
Select 10 credits for the Individualized Emphasis, an individualized cluster of courses approved in advance by the Music
Education Faculty, from an approved department list.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-05-012
Review Date: 02/25/2014
UCA Revision #1: 8/9/06
Director name last updated: 01/13/06
AA

Musical Arts

University Park, College of Arts and Architecture (MUBMA)

PROFESSOR SUE HAUG, Director, School of Music

The Bachelor of Musical Arts degree is a multidisciplinary or interdisciplinary program that is intended to prepare students
for careers in performance, while developing a secondary area of emphasis outside of music, as determined for each
student on the basis of an advising process. Completion of this program requires that the student achieve a high level of
competence in order to begin professional work or pursue further studies at the graduate level.

Entrance into this program will be determined by departmental evaluation. All students are required to pass a piano
proficiency examination.

For the Bachelor of Musical Arts, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(1-15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credits

REQUIREMENTS FOR THE MAJOR: 88-90 credits[1]
(This includes 1-15 credits of General Education courses: 1-3 credits of GA; 0-12 credits in the area of SUPPORTING
COURSES AND RELATED AREAS

PRESCRIBED COURSES (27 credits)
MUSIC 121(1), MUSIC 122(1), MUSIC 129S(3), MUSIC 131(2), MUSIC 132(2), MUSIC 162 IL(2) (Sem: 1-2)
MUSIC 221(1), MUSIC 222(1), MUSIC 231(2), MUSIC 261 IL(3), MUSIC 262 IL(3), MUSIC 266(1) (Sem: 3-4)
MUSIC 331(2), MUSIC 332(2) (Sem: 5-6)
MUSIC 101(1) (Sem: 7-8)

ADDITIONAL COURSES (4-6 credits)
INART 258A GA(3) or INART 258B GA(1) (Sem: 3-6)
Select 3 credits from MUSIC 461W(3), MUSIC 462W(3), MUSIC 463W(3), or MUSIC 464W(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (57 credits)
Select 21 credits in applied music through Level VIII of performance (Sem: 1-8)
Select 8 credits of approved ensembles (see School of Music Handbook for list of ensembles) (Sem: 1-8)
Select 4 credits in music in consultation with an adviser (Sem: 1-8)
Select 24 credits in consultation with adviser in an area of study other than music, at least 12 credits must be at the 400 level.
This list of courses must be approved by the College of Arts and Architecture's Dean of Undergraduate Studies. (0-12 of these 24 credits may be included in GENERAL EDUCATION) (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 39-01-017
Review Date: 8/24/2010
Director name last updated: 01/13/06
AA

Musical Theatre

University Park, College of Arts and Architecture (THRMT)

PROFESSOR JOHN SIMPKINS, in charge, Musical Theatre

The major is intended to provide students with specialized training leading to a high level of competence in musical theatre. Graduates should be able to begin professional work or pursue further training at the graduate level. This major is intended for those students who wish to pursue a career as a musical theatre professional. Acceptance into the major is based on an evaluative audition.

For the B.F.A. degree in Musical theatre, a minimum of 125 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 86 credits
(This includes 6 credits of General Education GA courses)

PRESCRIBED COURSES (81 credits)

Theatre courses (30 credits)
THEA 001S(1)[1], THEA 100 GA;US;IL(3)[1], THEA 115(2)[1], THEA 225A(2)[1], THEA 225B(2)[1], THEA 225C(2)[1] (Sem: 1-2)
THEA 132(3) (Sem: 2-4)
THEA 150(3)[1] (Sem: 2-4)
THEA 289(1)[1], THEA 425A(2)[1], THEA 425C(2)[1], THEA 427A(2)[1], THEA 427C(2)[1] (Sem: 3-4)
THEA 401Y IL(3)[1] (Sem: 5-8)

Music courses (23 credits)
THEA 113(3), THEA 116(2) (Sem: 1-2)
THEA 212(3), THEA 214(3), VOICE 110J GA(4) (Sem: 3-4)
VOICE 110J GA(4) (Sem: 5-6)
VOICE 412J(2), VOICE 462J(2) (Sem: 7-8)

Dance courses (12 credits)[1]
DANCE 231(1.5), DANCE 232(1.5) (Sem: 1-2)
DANCE 241(1.5), DANCE 242(1.5) (Sem: 3-4)
DANCE 251(1.5), DANCE 252(1.5), DANCE 382(1.5), DANCE 384(1.5) (Sem: 5-6)
Musical Theatre courses (16 credits)
MUSIC 113(1), MUSIC 114(1), THEA 114(3) [1] (Sem: 1-2)
THEA 223(2)[1], THEA 224(2)[1] (Sem: 3-4)
THEA 408 US(3)[1] (Sem: 5-6)
THEA 423(2)[1], THEA 424(2)[1] (Sem: 7-8)

ADDITIONAL COURSES (5 credits)
Select 2 credits from MUSIC 085 GA(1), MUSIC 089 GA(1), MUSIC 090 GA(1), MUSIC 091 GA(1), MUSIC 092 GA(1), MUSIC 093 GA,US;IL(1), MUSIC 094 GA(1), MUSIC 103 GA(1), MUSIC 104 GA(1), MUSIC 467(1), THEA 326(1 per semester, maximum of 3), THEA 428(2) (Sem: 3-6)
Select 3 credits, one from each of the following groups:
   a. DANCE 431(1.5), DANCE 441(1.5), DANCE 451(1.5) (Sem: 7-8)
   b. DANCE 432(1.5), DANCE 442(1.5), DANCE 452(1.5) (Sem: 7-8)
(Students may apply 6 credits of ROTC)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-05-008
Review Date: 2/23/16

AA

Nuclear Engineering

University Park, College of Engineering (NUC E)

PROFESSOR KAREN A. THOLE, Head, Department of Mechanical and Nuclear Engineering
PROFESSOR ARTHUR T. MOTTA, Program Chair, Nuclear Engineering Program

The overall educational objective of the Nuclear Engineering program is to help prepare our graduates to function effectively in the marketplace in a wide range of career paths in Nuclear Engineering. The technical part of the curriculum, emphasizes nuclear power engineering, which refers to complex systems used to generate electricity. Because of our strong educational and research emphasis in nuclear power engineering is strong, and because a shortage for this expertise exists in the industry, generally the industry values our graduates highly. We recognize that nuclear science, including nuclear security and non-proliferation, is an important growth area. We constantly assess and review the needs of our undergraduate students and their most frequent employers and use this feedback to consider revisions to our curriculum so that it is responsive to the needs of our constituents.

Program Educational Objectives:

Accordingly, we will endeavor to maintain and provide a curriculum that prepares our graduates such that:

• Within two to three years of graduation, we expect the majority of our B.S. graduates to:
  • be working in industry, especially related to nuclear power engineering,
  • be working in government agencies or national laboratories,
  • be pursuing advanced degrees.

• We expect that our students will continue to develop professionally and establish themselves in their careers and in this way may take the opportunity to further their education and training by attending graduate school or by pursuing other professional development.

Program Outcomes (Student Outcomes):

The Program outcomes are knowledge, skills, and/or behavior that are derived from the program educational objectives.

a. An ability to apply knowledge of mathematics, science, and engineering.
b. An ability to design and conduct experiments, as well as to analyze and interpret data.
c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d. An ability to function on multidisciplinary teams.
e. An ability to identify, formulate, and solve engineering problems.
f. An understanding of professional and ethical responsibility.
g. An ability to communicate effectively.
h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i. A recognition of the need for, and an ability to engage in life-long learning.
j. A knowledge of contemporary issues.
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The first two years of the program stress fundamentals in mathematics, chemistry, physics, computer programming, and engineering sciences such as mechanics, materials, and thermodynamics. The last two years provide the breadth and depth in nuclear science, behavior of heat and fluids, reactor theory and engineering, and radiation measurement. The laboratory work includes experiments using the University’s 1,000-kilowatt research reactor. Engineering design is incorporated in many courses from the freshman year to the senior year, but is particularly emphasized in the senior capstone design course, which integrates the critical elements of reactor theory, reactor engineering, safety considerations and economic optimization into a reactor design.

Many graduates are employed by electric power companies that use nuclear power plants, or by companies that help service and maintain those plants. They use their knowledge of engineering principles, radioactive decay, interactions of radiation with matter, and nuclear reactor behavior to help assure that the power plants meet the demand for reliable, economic electricity while ensuring a safe environment. To do this, graduates must be problem solvers who can develop
and use complex computer models and sophisticated monitoring systems, design systems to handle radioactive waste, determine if the materials in the plant are becoming brittle or corroded, or manage the fuel in the reactor to get the maximum energy from it. Other graduates work in industries that use radioactivity or radiation to detect problems or monitor processes. Jobs are also found in branches of the government as designers of the next generation of reactors for submarines, aircraft carriers, or space probes, or to manage and clean up contaminates wastes. They could also be involved with regulation of nuclear power or radiation uses, or in research to develop advanced technologies that will be used in next-generation power plants. Graduates who want to further their education in the fields of health physics, radiation biology, or nuclear medical applications find this degree to be a useful preparation.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Nuclear Engineering, a minimum of 129 credits is required. This baccalaureate program in Nuclear Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 111 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (89 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), EDSGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1], PHYS 212 GN(4)[1] (Sem: 1-2)
E MCH 211(3), E MCH 212(3), E MCH 213(3), M E 300(3), MATH 230(4), MATH 251(4)[1], PHYS 214 GN(2) (Sem: 3-4)
E E 212(3), E MCH 315(2), E MCH 316(1), M É 320(3), M É 410(3), NUC E 301(4)[1], NUC E 302(4)[1], NUC E 309(3)[1], NUC E 450(3)[1] (Sem: 5-6)
ENGL 202C GWS(3), NUC E 430(3), NUC E 430(3)[1], NUC E 431W(4), NUC E 451(3) (Sem: 7-8)

ADDITIONAL COURSES (19 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), ECON 014 GS(3) or E B F 200 GS(3) (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 3-4)
Select 6 credits, of which 3 credits must be designated as design, from BME 406(3), NUC E 405, NUC E 407(3), NUC E 408, NUC E 409, NUC E 420, NUC E 428, NUC E 444, NUC E 445, NUC E 460(3), NUC E 470(3), NUC E 490, NUC E 496(1-18), NUC E 497(1-9) or 500-level NUC E courses with approval of adviser (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
(These courses may have to be chosen so that the engineering design or engineering science requirements for the major are met.)
Select 3 credits in General Technical Elective (GTE) courses from department list. (Sem: 7-8)
(Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of GTE and 3 credits of GHA.)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2008
Blue Sheet Item #: 36-01-040
Review Date: 8/28/07
R & T: Approved 5/24/2013
UCA Revision #1: 8/9/06
UCA Revision #2: 7/30/07

Comments
EN
Nursing
Altoona College
Penn State Abington
Penn State Erie, The Behrend College
Penn State Harrisburg
University College: Penn State Fayette, Penn State Mont Alto, Penn State New Kensington, Penn State Schuylkill, Penn State Shenango, Penn State Worthington Scranton
University Park, School of Nursing (NURN)
World Campus

PROFESSOR PAULA MILONE-NUZZO, Dean, College of Nursing

This major prepares registered nurse students as professional practitioners in areas of health promotion and maintenance, illness care, and rehabilitation. The major in Nursing is accredited by the Accreditation Commission for Education in Nursing (ACEN), 3343 Peachtree Road NE, Suite 8500, Atlanta, GA 30326 (404-975-5000), www.acenursing.org; and the Commission on Collegiate Nursing Education (CCNE), One DuPont Circle, NW Suite 530, Washington, DC 20036 (202-463-6930). Part-time or full-time study is available at any of the campus sites. The University Park site is a blended program, which includes resident instruction and online nursing courses. The World Campus site is completely online.

Senate legislation 42-97 Credit by Portfolio Assessment enables students to receive credit for certain prescribed nursing courses based on their RN licensure.

Students must meet all requirements of the clinical institutions that provide preceptors and clinical experiences. These requirements may include CPR certification, professional liability insurance, health examination, drug testing, criminal background check (State and Federal) and child abuse history clearances. Students also are responsible for their own transportation to and from clinical settings and may need the use of a car.

Graduates of this major may qualify for admission to a graduate nursing program.

For the B.S. degree in Nursing, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 3-5 credits

REQUIREMENTS FOR THE MAJOR: 91-93 credits[1]
(This includes 21 credits of General Education courses: 3 credits of GHA courses; 9 credits of GN courses; 3 credits of GQ courses; 6 credits of GS courses.)

PRESCRIBED COURSES (76 credits)
BIOL 129 GN(4), BIOL 141 GN(3), BIOL 142(1), HD FS 129 GS(3), MICRB 106 GN(3), MICRB 107 GN(1), NUTR 251 GHA(3), PSYCH 100 GS(3) (Sem: 1-4)
NURS 200W(3)[38], NURS 251(3)[38], NURS 357(3)[38], NURS 390 US(3)[38] (Sem: 3-4)
NURS 225(3)[37], NURS 230(4)[37], NURS 250 US(2)[37], NURS 301(4)[37], NURS 305(3)[37], NURS 306(3)[37], NURS 310(3)[37], NURS 320(3)[37], NURS 405B(4)[37], NURS 420(4)[37], (Sem: 5-6)
NURS 417 US[4], NURS 465(3)[38], NURS 475(3)[38] (Sem: 7-8)

ADDITIONAL COURSES (9-11 credits)
CHEM 101 GN(3); or CHEM 110 GN(3) and CHEM 111 GN(1) (Sem: 1-4)
SOC 001 GS(3) or SOC 005 GS(3) (Sem: 1-4)
STAT 200 GQ(4) or STAT 250 GQ(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits from courses on school-approved list in consultation with adviser (3 credits of which must be at the 400 level)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[37] Credit by Portfolio Assessment

[38] Due to restricted enrollment, the School of Nursing assigns the semester in which students enroll in these courses and all course prerequisites must be successfully completed.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-05-061

Review Date: 02/23/2010

UCA Revision #1: 8/9/06

HH

Updated contact info for ACEN accrediting agency: 7/31/13
Nursing

Penn State Altoona (General Nursing and Second Degree)
Penn State Erie, Behrend Campus (General Nursing)
Penn State Harrisburg (Second Degree)
University Park (General Nursing)
University College: Penn State Fayette, Penn State Mont Alto, Penn State Worthington Scranton (General Nursing)

PROFESSOR PAULA MILONE-NUZZO, Dean, College of Nursing

The Bachelor of Science Degree in Nursing prepares students to become professional practitioners in areas of health promotion and maintenance, illness care, and rehabilitation. After earning this degree in Nursing, students are qualified to take the registered nurse examination for licensure by the State Board of Nursing. The Nursing major is accredited by the Accreditation Commission for Education in Nursing (ACEN), 3343 Peachtree Road NE, Suite 850, Atlanta, GA 30326 (404-975-5000), www.acenursing.org; the Commission on Collegiate Nursing Education (CCNE), One DuPont Circle, NW Suite 530, Washington, DC 20036 (202-463-6930); and approved by the Pennsylvania State Board of Nursing.

B.S. Nursing majors will choose one of the following options:

General Nursing Option (NURS GNURS): This option admits students directly to the major as first year students and at the time of admission only. Nursing students will start and remain at the campus of admission all 4 years. Non-nursing students may not transfer or change major into the 4-year nursing program at University Park, but will be considered through a competitive review process for admission (beginning fall 2015) at the 5 other campuses offering the General Nursing program. Clinical experiences occur at clinical facilities within a 50-mile radius of campus; University Park students will spend 1-2 years at Penn State Hershey Medical Center, which requires students to reside at that location.

Second or Additional Degree Option (NURS SCND): This option admits students, who have successfully completed a bachelor's degree in another discipline, to the major through a review process. All students must have met all general education and prerequisite course requirements. This option is available at Penn State Altoona and Penn State Harrisburg. Clinical experiences occur at facilities surrounding Altoona and Harrisburg.

For Both Options: All transportation and expenses related to clinical are the responsibility of the student. All students must carry professional liability insurance; complete an annual health examination, criminal background and child abuse history clearance; maintain CPR certification and adhere to any additional requirements of the clinical facilities.

Undergraduate Academic Progression Policy

The Academic Progression policy delineates the academic standards for pre-licensure students (students without an RN license). Failure of two nursing courses results in dismissal from the Nursing major. Details of the academic progression policy are available in the student handbook. (www.hhdev.psu.edu/nurs/Handbooks/index.html).

For the B.S. degree in Nursing, a minimum of 120 credits is required. The Second or Additional Degree Option requires the completion of 60 credits of general education and prerequisite courses in the first degree program (prior to admission) and 60 credits of nursing courses completed after admission.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

(Second or Additional Degree Option: First-Year Seminar not required since students accepted into this program are required to have earned a bachelor's degree in another discipline)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 4-9 credits

REQUIREMENTS FOR THE MAJOR: 87-92 credits[1] [2]
(This includes 21 credits of General Education courses; 3 credits of GHA courses; 9 credits of GN courses; 3 credits of GQ courses; 6 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 30-32 credits

PRESCRIBED COURSES (21 credits)
BIOL 129 GN(4), BIOL 141 GN(3), BIOL 142(1), HD FS 129 GS(3), MICRB 106 GN(3), MICRB 107 GN(1), NUTR 251 GHA(3), PSYCH 100 GS(3) (Sem: 1-4)

ADDITIONAL COURSES (9-11 credits)
CHEM 101(3); or CHEM 110 GN(3) and CHEM 111 GN(1) (Sem: 1-4)
SOC 001 GS(3) or SOC 005 GS(3) (Sem: 1-4)
STAT 200 GQ(4) or STAT 250 GQ(3) (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 57-60 credits

GENERAL NURSING OPTION: (57 credits)

PRESCRIBED COURSES (54 credits)
NURS 225(3)[38], NURS 230(4)[38], NURS 250 US(2)[38], NURS 251(3)[38] (Sem: 3-4)
NURS 200W(3)[38], NURS 301(4)[38], NURS 305(3)[38], NURS 306(3)[38], NURS 310(3)[38], NURS 320(3)[38], NURS 350(2)[38] (Sem: 5-6)
NURS 405A(4)[38], NURS 405B(4)[38], NURS 415 US;IL(4)[38], NURS 420(4)[38], NURS 450A(2)[38], NURS 450B(3)[38]
(Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits at the 400 level from School-approved list in consultation with adviser (Sem: 7-8)

SECOND OR ADDITIONAL DEGREE OPTION: (60 credits)

PRESCRIBED COURSES (60 credits)
NURS 225(3)[38], NURS 230(4)[38], NURS 250 US(2)[38], NURS 251(3)[38] (Sem: 1)
NURS 200W(3)[38], NURS 301(4)[38], NURS 305(3)[38], NURS 310(3)[38], NURS 350(2)[38] (Sem: 2)
NURS 306(3)[38], NURS 320(3)[38], NURS 415 US;IL(4)[38], NURS 420(4)[38] (Sem: 3)
NURS 405A(4)[38], NURS 405B(4)[38], NURS 450A(2)[38], NURS 450B(3)[38], NURS 495(6)[38] (Sem: 4)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[2] Completed prior to admission for students taking the Second or Additional Degree Option.
[38] Due to restricted enrollment, the School of Nursing assigns the semester in which students enroll in these courses and all course prerequisites must be successfully completed.

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 38-05-062
Review Date: 02/23/2010
(R&T 2/28/06)
UCA Revision #1: 8/9/06
Update to accrediting agency contact info: 7/31/13

Comments
HH

Nutritional Sciences

University Park, College of Health and Human Development (NUTR)

PROFESSOR GORDON JENSEN, Head of the Department

The study of nutrition is a dynamic science that incorporates knowledge of human biology and biochemistry to understand how the body utilizes nutrients and related substances for optimal health throughout the lifecycle. Students gain an understanding of how the interplay of nutrition and lifestyle relate to current public health issues as well as the development and nutrition management of chronic and acute diseases. Students learn the scientific rationale and practice methodology to assess nutritional status for individuals in the clinical setting and for population analysis. They will use these skills to implement medical nutrition therapy or understand nutrition guidelines, standards, and policies.

Students may select one or more Options: Applied Sciences, Basic Sciences, and Dietetics. Students in any option can choose from one or more of four Emphases: Public Health Nutrition and Policy; Nutrition and Foods in Business; Community Nutrition and Food Security; or Nutrition Education and Communications.

APPLIED SCIENCES OPTION: This Option integrates knowledge of social and behavioral sciences with human physiology and nutrition. Students learn to apply knowledge of nutrition to improve health and well-being of individuals and populations by applying nutrition principles in different practice settings. Graduates of this Option can seek employment in public health and policy, business including the food industry, community and international agencies, schools, or continue to graduate study in nutrition or related fields.

BASIC SCIENCES OPTION: This option incorporates knowledge from biology, chemistry, physiology, and physics with nutrition. This Option is recommended for students preparing for careers in medicine and other health related fields such as dentistry, optometry, physician assistant, physical therapy, and chiropractic, including graduate school. Also, this option prepares students for careers in laboratory research in the pharmaceutical or food industries, government, or academia.

DIETETICS OPTION: This Option links nutrition and human behavior to improve the nutritional status of individuals and communities or apply nutrition principles and counseling skills to medical problems in clinical dietetics. It also prepares students for management positions in nutrition and food systems. Graduates satisfy the current requirements for application to an accredited post-baccalaureate dietetic internship. Upon satisfactory completion of a Dietetic Internship, graduates are eligible to take the registration examination to become a Registered Dietitian.

Admission to the Dietetics Option: C or better in NUTR 251, BIOL 141, and CHEM 110

For the B.S. degree in Nutritional Sciences, a minimum of 120 credits is required.
Per Senate Policy 83.80.5, the college dean or campus chancellors and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. NUTR requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(17-22 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**  
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**  
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**  
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 5-8 credits

**REQUIREMENTS FOR THE MAJOR:** 86-87 credits  
(This includes 18-20 credits of General Education courses: Applied Sciences Option: 7-9 credits of GN courses; 3-4 credits of GQ courses; 6 credits of GS courses; 3 credits of GHA courses; or Basic Sciences Option: 7-9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHA courses; or Dietetics Option: 7-9 credits of GN courses; 3-4 credits of GQ courses; 3 credits of GS courses; 3 credits of GHA courses.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 29-30 credits

**PRESCRIBED COURSES** (23 credits)  
NUTR 251 GHA[1], NUTR 358[2] (Sem: 1-3)  
B M B 211[1], NUTR 445[1], NUTR 446[1], NUTR 451[1] (Sem: 5-7)  
NUTR 452, NUTR 490W (Sem: 7-8)

**ADDITIONAL COURSES** (6-7 credits)  
STAT 200 GQ or STAT 250 (Sem: 1-3)  
CHEM 202 or CHEM 210 (Sem: 2-4)

**REQUIREMENTS FOR THE OPTION:** 57 credits

**APPLIED SCIENCES OPTION:** (57 credits)

**PRESCRIBED COURSES** (30 credits)  
BIOL 141 GN, CHEM 110 GN, (Sem: 1-3)  
MICRB 106 GN, MICRB 107 GN, NUTR 320, NUTR 360 (Sem: 4-6)  
HM 228, HM 329, HM 330, NUTR 456 US (Sem: 5-6)  
NUTR 370, NUTR 400, NUTR 453 (Sem: 7-8)

**ADDITIONAL COURSES** (6 credits)  
AG BM 101 GS, ECON 102 GS, or ECON 104 GS (Sem: 1-4)  
HD FS 129 GS or PSYCH 100 GS (Sem: 1-4)

**SUPPORTING COURSES AND RELATED AREAS** (21 credits)  
Select 21 credits, in consultation with an adviser, from University-wide offerings that provide relevance to this option. See program list of recommended courses. (At least 6 credits must be at the 400 level, and, of those, no more than 3 credits may be NUTR 496.) (Sem: 3-8). Students are encouraged to select one (or more) of four Emphases: Public Health Nutrition and Policy; Nutrition and Foods in Business; Community Nutrition and Food Security; and Nutrition Education and Communications. A minimum of 15 credits is recommended for an Emphasis.

**BASIC SCIENCES OPTION:** (57 credits)

**PRESCRIBED COURSES** (38 credits)  
BIOL 110 GN, BIOL 141 GN, BIOL 142, BIOL 230W GN, CHEM 110 GN, CHEM 111 GN, CHEM 112 GN, CHEM 113 GN, MATH 140 GQ (Sem: 1-3)  
B M B 212, MICRB 201, MICRB 202, PHYS 250 GN, PHYS 251 GN (Sem: 3-4)

**ADDITIONAL COURSES** (3 credits)  
CHEM 203 or CHEM 212 (Sem: 4-6)

**SUPPORTING COURSES AND RELATED AREAS** (16 credits)  
Select 16 credits, in consultation with an adviser, from University-wide offerings that provide relevance to this option. See program list of recommended courses. (At least 9 credits must be at the 400 level, and, of those, no more than 6 credits may be NUTR 496.) (Sem: 3-8)

**DIETETICS OPTION:** (57 credits)

**PRESCRIBED COURSES** (38 credits)  
BIOL 141 GN, CHEM 110 GN[1], (Sem: 1-3)  
MICRB 106 GN, MICRB 107 GN, NUTR 320, NUTR 360 (Sem: 4-6)  
HM 228, HM 329, NUTR 456 US, NUTR 391 (Sem: 5-6)  
HM 330, NUTR 370, NUTR 386 (Sem: 6-8)  
NUTR 371, NUTR 400, NUTR 453, NUTR 495 (Sem: 7-8)

**ADDITIONAL COURSES** (3 credits)  
HD FS 129 GS or PSYCH 100 GS (Sem: 1-4)

**SUPPORTING COURSES AND RELATED AREAS** (16 credits)  
Select 16 credits, in consultation with an adviser, from University-wide offerings that provide relevance to this option. See program list of recommended courses. (At least 6 credits must be at the 400 level, and, of those, no more than 3 credits may be NUTR 496.) (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012
Petroleum and Natural Gas Engineering

University Park, College of Earth and Mineral Sciences (PNG E)

PROFESSOR Russell Johns, Undergraduate Program Chair

The B.S. program in Petroleum and Natural Gas Engineering is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: 410-347-7700.

The undergraduate curriculum in petroleum and natural gas engineering has been designed to equip the student with the fundamentals necessary to achieve lifelong professional growth. Graduates are prepared to enter both the private and public sectors as petroleum and natural gas engineers or to pursue further education at the graduate level.

The courses are structured to serve as a melting pot for theory, application to case studies and engineering project design. This enables the student to appreciate and understand that a successful engineering design project requires a sound theoretical foundation, experimentation and engineering judgment. The thrust of the program structure emphasizes the fundamentals of mathematics and earth and engineering sciences and integrates them in application to traditional petroleum and natural gas engineering topics. Design projects are required throughout the curriculum. Execution of these projects requires an amalgamation of problem formulation strategies, testing of alternative design methodologies, feasibility studies, and economic and environmental considerations. Graduates of the program are expected to perform in various facets of the petroleum industry including drilling, production, evaluation, transportation and storage. The petroleum and natural gas engineering faculty and staff are committed to an interactive teaching and learning environment to ensure that the student is an active participant in the learning process. General education opportunities are sufficiently broad and diverse in scope to enable the student to tailor the educational experience to particular interests, background and expected role in society.

Petroleum and Natural Gas Engineering Student Outcomes:

1. Our students, at the time of their graduation, will have a working knowledge of basic math, science skills and engineering skills.
2. Our students, at the time of their graduation, will be equipped with ability to design and conduct experiments as well as to analyze and interpret data.
3. Our students, at the time of their graduation, will be ready to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4. Our students, at the time of their graduation, will be able to function in multi-disciplinary teams.
5. Our students, at the time of their graduation, will be equipped with the necessary skills to identify, formulate and solve engineering problems.
6. Our students, at the time of their graduation, will have a thorough understanding of professional and ethical responsibilities.
7. Our students, at the time of their graduation, will be equipped with the necessary communication skills to communicate effectively.
8. Our students, at the time of their graduation, will have a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
9. Our students, at the time of their graduation, will be instilled with the recognition of the need for, and an ability to engage in lifelong learning.
10. Our students, at the time of their graduation, will attain knowledge on contemporary issues.
11. Our students, at the time of their graduation, will have an ability to use the techniques, skills and modern engineering tools that are necessary for engineering practice.

Petroleum and Natural Gas Engineering Program Educational Objectives:

1. Our graduates will integrate key science and engineering principles to address the technological challenges of the petroleum and natural gas industry.
2. Our graduates will practice in a broad range of petroleum engineering fields working on teams that create innovative solutions to the most pressing problems of the petroleum and natural gas industry by implementing the ideals of ethical behavior, professionalism, and environmental sensitivity and social awareness.
3. Our graduates will be recognized as critical and independent thinkers and will assume positions of leadership in defining the social, intellectual, business and technical dimensions of the professional organizations they belong to.
4. Our graduates will continue their life-long learning process and participate in graduate education to remain as effective professionals in the workplace of the future.

ENTRANCE TO MAJOR-- (Effective for students admitted beginning Summer 2013) -- In the event that the major is under enrollment control, a higher minimum cumulative grade-point average (GPA) then the minimum described by University Policies is likely to be needed. In addition to this minimum grade point average requirement, the following entrance to major requirements must also be completed with a minimum grade of C: CHEM 110 (GN)(3) [1], CHEM 112 (GN)(3)[1], MATH 140 (GQ)(4)[1], MATH 141 (GQ)(4)[1], and PHYS 211 (GN)(4)[1]. These courses must be completed by the end of the semester during which the entrance to major process is carried out. To be eligible for consideration for entrance to this major, students must be enrolled in the College of Earth and Mineral Sciences or Division of Undergraduate Studies at the time that they confirm their major choice.

Integrated B.S. in Petroleum and Natural Gas Engineering (PNG E) and M.S. in Energy and
Mineral Engineering (EME)

The integrated undergraduate-graduate (IUG) program between the Petroleum and Natural Gas Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused PNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. Students should refer to the Energy and Mineral Engineering graduate program in the Graduate Program Bulletin for the IUG admission and degree requirements. (http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm?letter=E&program=grad_em.htm)

For the B.S. degree in Petroleum and Natural Gas Engineering, a minimum of 129 credits is required.  

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits  
(30 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:  
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 114 credits  
(This includes 30 credits of General Education courses: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (99 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3)[1], ECON 102 GS(3), EM SC 100S GWS(3)[88], EME 140 GQ(4)[1], MATH 141 GQ(4)[1], MATH 230(4), MATH 251(4), PHYS 211 GN(4)[1], PHYS 212 GN(4)[1], PHYS 213 GN(2) (Sem: 1-4)
E MCH 210(5)[77], E MCH 212(3), GEOSC 001(3) (Sem: 3-4)
EME 301(3)[1], EME 303(3)[1], EME 460(3), GEOSC 454(3), P N G 405(3)[1], P N G 406(1)[1], P N G 410(3)[1], P N G 450(3)[1], P N G 451(1)[1], P N G 475(3)[1], P N G 490(1) (Sem: 5-6)

ADDITIONAL COURSES (9 credits)
Select 9 credits: one course from categories a, b, and c.

a. ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)

b. PHIL 103 GH(3), PHIL 106 GH(3), PHIL 107 GH(3), or PHIL 233 GH(3) (Sem: 3-4)

c. CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with adviser (Students may apply 6 credits of ROTC.) (Sem: 7-8)

Course Substitutions for the Integrated B.S. in Petroleum and Natural Gas Engineering (PNG E) and M.S. in Energy and Mineral Engineering (EME)

As many as twelve of the credits required for the master's degree may be applied to both the B.S. and M.S. degrees. A minimum of six credits counted for both the B.S. and M.S. degrees must be at the 500-level. Thesis and culminating/capstone experience credits may not be double counted. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[77] Students at commonwealth campuses and/or transfer students can substitute the combination of E MCH 211 and E MCH 213.

[88] The following substitutions are allowed for students attending campuses where the indicated course is not offered: CAS 100 GWS can be substituted for EM SC 100S GWS.

R & T: Approved 5/24/2013

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-029

Review Date: 08/20/13

UCA Revision #1: 8/9/06

Philosophy

University Park, College of the Liberal Arts (PHIL)

PROFESSOR AMY ALLEN, Head of the Department
This major provides in-depth study of fundamental issues that inescapably confront all persons. Topics include ethics, social and political philosophy, and aesthetics—study of the good life, justice, and beauty; metaphysics, philosophy of mind, and philosophy of religion—study of the nature of reality, mind, body, and the meaning of life and death; epistemology, philosophy of science, and logic—study of the nature of knowledge, truth, objectivity, and principles of sound reasoning; and subjects such as comparative philosophies and world cultures, feminist theory, and philosophical issues in technology, language, education, and the professions of law, business, medicine, communications, engineering, and agriculture. These studies enhance imaginative, interpretive, analytical, critical, and communicative capacities. Majors thus may acquire intellectual abilities crucial for self-fulfillment, responsible participation in public life, and success in a wide range of careers—including law, business, education, journalism, medicine, and public service.

Majors pursued concentration in history of philosophy; humanities and arts; philosophy of science and mathematics; social sciences; the professions; or justice, law, and values. This is combined easily with minors, area studies, and concurrent majors. Qualified students participate in honors study and internships.

For the B.A. degree in Philosophy, a minimum of 124 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

GENERAL PHILOSOPHY OPTION: This option provides students with a concentration in the history of western philosophy and the historical development and impact of philosophical ideas and issues—from the ancient to the contemporary period. It is designed for all students who seek a broad liberal education, including students interested in graduate study in philosophy.

HUMANITIES AND ARTS OPTION: This option provides students with a concentration in philosophical issues in the arts, art history, literature, languages, history and religion. It is designed for all students primarily interested in the philosophical dimensions of the arts, humanities, and cultural studies, including students with career or further educational goals in these fields.

PHILOSOPHY OF SCIENCE AND MATHEMATICS OPTION: This option provides students with a concentration in philosophical issues in the life sciences, the physical sciences, mathematics, engineering, and technology. It is designed for all students primarily interested in the philosophical dimensions of the natural sciences, technology, and mathematics, including students with career or further educational goals in these fields.

SOCIAL SCIENCES OPTION: This option provides students with a concentration in philosophical issues in the social sciences, social and political theory, and education. It is designed for all students primarily interested in the philosophical dimensions of the social sciences, educational theory, and public policy, including students with career or further educational goals in these fields.

PROFESSIONAL STUDIES OPTION: This option provides students with a concentration in philosophical issues and dimensions in the theory and practice of the professions of agriculture, business, engineering, journalism, law, and medicine and health care. It is designed for all students seeking a foundation in the philosophical dimensions of these professions, including students who wish to combine humanistic study with career or further educational goals in these fields.

JUSTICE, LAW, AND VALUES OPTION: This option provides students with a concentration in philosophical issues in aesthetics, ethics, jurisprudence, and social and political theory, and everyday life. It is designed for students primarily interested in moral, social, political, and legal questions concerning value and is especially appropriate for those anticipating future educational work in law school.

TO VIEW THE Philosophy Minor (PHIL)

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 25 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 30 credits[1]

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 9 credits

ADDITIONAL COURSES: (9 credits)
Select 9 credits in philosophy at the 200 level (Sem: 3-6)

REQUIREMENTS FOR THE OPTION: 21 credits

GENERAL PHILOSOPHY OPTION: 21 credits

PRESCRIBED COURSES (3 credits)
PHIL 012 GQ(3) (Sem: 1-6)
ADDITIONAL COURSES (9 credits)
Select 6 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits from PHIL 200 GH(3), PHIL 201 GH(3), PHIL 202 GH(3), PHIL 203 GH(3), PHIL 204 GH(3) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in philosophy at the 400 level, in consultation with adviser (Sem: 5-8)

HUMANITIES AND ARTS OPTION: 21 credits
ADDITIONAL COURSES (12 credits)
Select 3 credits from PHIL 010 GH(3), PHIL 012 GQ(3) (Sem: 1-6)
Select 6 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits from PHIL 401(3), PHIL 402(3-6), PHIL 409(3), PHIL 413(3), PHIL 424(3), PHIL 429(3), PHIL 435(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 6 additional credits in philosophy at the 400 level and 3 credits at the 400 level in a related arts or humanities discipline, in consultation with adviser (Sem: 5-8)

PHILOSOPHY OF SCIENCE AND MATHEMATICS OPTION: 21 credits
PRESCRIBED COURSE (3 credits)
PHIL 012 GQ(3) (Sem: 1-6)

ADDITIONAL COURSES (9 credits)
Select 6 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits from PHIL 407(3), PHIL 410(3), PHIL 412(3), PHIL 417(3), PHIL 425(3), PHIL 426(3-6), PHIL 427(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 6 additional credits in philosophy at the 400 level and 3 credits at the 400 level in a mathematics or natural science discipline, in consultation with adviser (Sem: 5-8)

SOCIAL SCIENCES OPTION: 21 credits
PRESCRIBED COURSE (3 credits)
PHIL 012 GQ(3) (Sem: 1-6)

ADDITIONAL COURSES (9 credits)
Select 6 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits from PHIL 401(3), PHIL 408(3), PHIL 415(3), PHIL 416(3), PHIL 425(3), PHIL 438(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 6 additional credits in philosophy at the 400 level and 3 credits at the 400 level in social science, in consultation with adviser (Sem: 5-8)

PROFESSIONAL STUDIES OPTION: 21 credits
ADDITIONAL COURSES (12 credits)
Select 6 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits from PHIL 010 GH(3), PHIL 012 GQ(3) (Sem: 1-6)
Select 3 credits from PHIL 405(3), PHIL 406(3), PHIL 418(3), PHIL 423(3), PHIL 431(3), PHIL 432(3), PHIL 433(3), PHIL 435(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits at the 400 level in a professional area outside philosophy, in consultation with adviser (Sem: 5-8)

JUSTICE, LAW, AND VALUES OPTION: 21 credits
PRESCRIBED COURSE (3 credits)
PHIL 105 GH(3) (Sem: 1-6)

ADDITIONAL COURSES (18 credits)
Select 3 credits from PHIL 010 GH(3), PHIL 012 GQ(3) (Sem: 1-6)
Select 3 credits in philosophy at the 00 or 100 level (Sem: 1-6)
Select 3 credits in philosophy at the 400 level (Sem: 5-8)
Select 3 credits from PHIL 403(3), PHIL 405(3), PHIL 406(3), PHIL 407(3), PHIL 408(3), PHIL 418(3), PHIL 420(3), PHIL 425(3), PHIL 432(3), PHIL 433(3), PHIL 438(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2005
Blue Sheet Item #: 33-06-154
Review Date: 04/12/05
UCA Revision #2: 7/30/07
LA
Dept Head updated: 9/25/15
Physics

University Park, Eberly College of Science (PHYS)

PROFESSOR NITIN SAMARTH, George A. and Margaret M. Downsborough Department Head

This major provides a sound program of technical and general education for students planning a career in physics and related fields. The General option provides broad coverage with the most physics and mathematics course requirements and is useful for students intending to pursue graduate study in Physics or similar disciplines. The Medical and Electronics options incorporate coursework in support of the application of physics and mathematics in various life-science or engineering related fields. A Computation option provides background in the application of physical principles and mathematical methods in the solution of scientific problems, simulations, or visualizations using computer and numerical techniques. The Nanotechnology/Material Science option provides students with background in the understanding of condensed matter physics at either the nano- or micro/macro- levels.

In order to be eligible for entrance to the Physics major, a student must have: 1) attained at least a 2.00 cumulative grade-point average; 2) completed CHEM 110 GN(3), MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), and PHYS 212 GN(4), and earned a grade of C or better in each of these courses.

TO VIEW THE Physics Minor (PHYS)

For the B.S. degree in Physics, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 93-96 credits
(This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 69 credits

PRESCRIBED COURSES (59 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1] (Sem: 1-2)
PHYS 211 GN(4)[1], PHYS 212 GN(4)[1], PHYS 213 GN(2)[1], PHYS 214 GN(2)[1], PHYS 237(3)[1] (Sem: 1-4)
ENGL 202C GWS(3), MATH 220 GQ(2), MATH 251(4) (Sem: 3-4)
PHYS 400(4)[1], PHYS 410(4)[1], PHYS 419(3)[1], PHYS 420(3)[1], PHYS 444(2)[1], PHYS 457W(3)[1] (Sem: 5-8)

ADDITIONAL COURSES (7 credits)
MATH 230(4)[1], or MATH 231(2)[1] and MATH 232(2)[1] (Sem: 3-4)
CMPSC 101 (Sem: 3-4) or CMPSC 121 (Sem: 3-4) or CMPSC 200 (Sem: 3-4) or CMPSC 201 (Sem: 3-4) or CMPSC 202 (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Take 3 credits of 400-level MATH from departmental list (Sem: 7-8)

REQUIREMENTS FOR THE OPTION: 24-27 credits

COMPUTATION OPTION: (24 credits)

PRESCRIBED COURSES (9 credits)
CMPSC 122(3) (Sem: 3-4) (Note: CMPSC 122 has CMPSC 121 as a pre-requisite, so care should be taken when choosing the 'programming requirement' under the Common Requirements for the major.)
MATH 455(3), MATH 456(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 6 credits from program list (Sem: 3-6)
Select 3 credits of natural science (GN) courses that are not listed in the major (Sem: 5-6)
Take a total of 6 credits from AERESP 424(3), 300-400-level CMPSC, 400-level MATH from departmental list or 400-level STAT (Sem: 5-8)

ELECTRONICS OPTION: (27 credits)

PRESCRIBED COURSES (4 credits)
E E 210(4) (Sem: 3-6)

ADDITIONAL COURSES (8 credits)
Select 2 of the following 3: E E 310(4), E E 350(4), CMPEN 270(4) (Sem: 4-6)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 6 credits from program list (Sem: 3-6)
Select 3 credits of natural science (GN) courses that are not listed in the major (Sem: 5-6)
Take 6 credits of E E 3XX or 4XX level courses (Sem: 5-8)
GENERAL PHYSICS OPTION: (25-26 credits)

ADDITIONAL COURSES (10-11 credits)
Select 6-7 credits from items a, b, and/or c (Sem: 7-8)

a. PHYS 406(3), PHYS 411(3), PHYS 412(3), PHYS 413(3), PHYS 443(3), PHYS 461(3), PHYS 479(3), PHYS 496(3) or PHYS 497(3)
b. PHYS 402(4) or PHYS 458(4) (the course not selected below may be used)
c. ASTRO 410(3), ASTRO 440(3), or ASTRO 485(3) (only 3 credits of ASTRO courses may be used)

Select 4 credits from PHYS 402(4) or PHYS 458(4) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 3 credits of natural science (GN) courses that are not listed in the major (Sem: 3-8)
Select 9 credits from program list: a maximum of 6 of the 12 credits may be from PHYS 496(1-18), SC 295(1-9), SC 395(1-9), or SC 495(1-9) (Sem: 3-8)
Select 3 credits of 4XX-level MATH from program list (Sem: 7-8)

MEDICAL PHYSICS OPTION: (24-25 credits)
This option prepares students for graduate study in medical physics, medical school, or bioengineering. The courses in option (b) below help satisfy the requirements for a minor in Bioengineering. Application for the BIOE minor must be made to the Department of Bioengineering.

ADDITIONAL COURSES (15-16 credits)
Select from the following two sets of courses:

(a) BIOL 110 GN(4), and BIOL 240W GN(4), CHEM 210(2), CHEM 212(3), CHEM 213(3) (Sem: 3-8)
(b) B M B 251(3) or BIOL 230W GN(4) or BME 201(3); BIOL 141 GN(3) or BIOL 472(3); 9 credits of BIOE at the 300 or 400 level (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits from program list: a maximum of 6 of the 9 credits may be from PHYS 496(1-18), SC 295(1-9), SC 395(1-9) or SC 495(1-9) (Sem: 5-8)

NANOTECHNOLOGY/MATERIAL SCIENCE OPTION: (24-25 credits)

PRESCRIBED COURSES (3 credits)
PHYS 412(3) (Sem: 7)

ADDITIONAL COURSES (12-13 credits)
The courses in option (a) help satisfy the requirements for the Nanotechnology minor.
Select from the following two sets of courses:

(a) E SC 312(3), E SC 313(3) and select 6 credits from E SC 400-level courses
(b) MATSE 201(3), MATSE 430(3), MATSE 460(1); MATSE 402(3) or MATSE 436(3); select 3 credits from MATSE 400-level courses (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 6 credits from program list (Sem: 3-6)
Select 3 credits of natural science (GN) courses that are not listed in the major (Sem: 5-6)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-06-096
Review Date: 04/09/2013

Comments
SC

Planetary Science and Astronomy

University Park, Eberly College of Science (PASTR)

Professor Donald Schneider, Chair

Planetary Science and Astronomy majors will study the Earth system in the context of the Solar System and the universe as a whole. Students will apply methods and knowledge from mathematics, geosciences, chemistry, biology, astronomy and physics, and through laboratory experiences and coursework they will both learn to explore the Earth and to use telescopes to obtain astronomical data. They will study planetary systems around other stars and explore the possibility of their harboring life. Communication of these topics, both oral and written, to the public and to their peers will be emphasized, as will logic and general problem-solving skills. Upon graduation students will be prepared to enter a graduate program in education to obtain teaching certification, to work in an informal science venue or planetarium, or to enter a variety of industry, environmental, or defense professions.

In order to be eligible for entrance to the Planetary Science and Astronomy major, a student must have: 1) Attained at least a 2.00 cumulative grade-point average; 2) Completed Math 140 with a grade of C or better; 3) Completed at least four of the following courses with a grade of C or better: ASTRO 120, ASTRO130, ASTRO 140, BIOL 110, CHEM 110, EARTH 002, GEOSC 001, GEOSC 020, or STAT 200.

A minimum of 122 credits is required to earn the degree.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of the Bulletin)

FIRST-YEAR SEMINAR:
(Included in General Education course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in General Education course selection)

WRITING ACROSS THE CURRICULUM:
(Included in General Education course selection or REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 95-99 credits
(This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses)

PRESCRIBED COURSES: 37 credits
BIOL 110 GN(4)[1], CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3)[1], CHEM 113 GN(1), ENGL 202C GWS(3), MATH 140 GQ(4)[1], MATH 141 GQ(4) (Sem: 1-4)
ASTRO 401(4)[1], ASTRO 402(3)[1], BIOL/GEOSCL 474(3)[1], STAT 200 GQ(4)[1] (Sem: 5-8)

ADDITIONAL COURSES: 38-39 credits
Select 3 credits from ASTRO 001 GN(3), ASTRO 005 GN(3), ASTRO 006 GN(3), ASTRO 291 GN(3) (Sem: 1-4)
Select 3-4 credits from CMPSC 101 GQ(3), CMPSC 121 GQ(3), CMPSC 201 GQ(3), CMPSC 202 GQ(3), CMPSC 203 GQ(4) (Sem: 1-6)
Select 9 credits from ASTRO 120 GN(3), ASTRO 130 GN(3), ASTRO 140 GN(3), ASTRO 292 GN(3) (Sem: 1-6)
Select 3 credits from EARTH 002 GN(3), GEOSC 001(3), GEOSC 020 GN(3) (Sem: 1-4)
PHYS 211 GN(4) or PHYS 250 GN(4) (Sem: 3-6)
PHYS 212 GN(4) or PHYS 251 GN(4) (Sem: 3-6)
Select 12 credits from EARTH 100 GN(3), EARTH 103 GN(3), EARTH 106 GN(3), EARTH 150 GN(3), EARTH 202(3), GEOG 160 GS(3), GEOSC 201(4), GEOSC 202(4), GEOSC 203(4), GEOSC 204(4), METEO 101 GN(3), METEO 201(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS: 20-23 credits
At least 6 credits from the below categories must be at the 400 level
Select 11 credits in consultation with adviser from department list (Sem: 1-8)
Select 9-12 credits from program list of advanced electives (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-05-146
Review Date: 02/19/2013

Plant Sciences

University Park, College of Agricultural Sciences (PLANT)
PROFESSOR RICH MARINI, Head, Department of Horticulture

The Plant Sciences Major is an applied biological science program designed for students seeking careers in agronomic and horticultural crop production systems and enterprise management, agroecology, sustainable and organic managed and natural ecosystems, crop protection, applied plant physiology, plant science research, and plant biotechnology. Students will secure: (1) a working knowledge of basic plant biology, soils, pests, and pathogens with emphasis on growth, development, and physiology in an ecological and agricultural context, (2) the scientific, technical, and computational approaches to problem solving in an ecological and agricultural context, individually and in teams, (3) the ability to analyze ethical issues regarding ecosystem sustainability, business practices and plant science, and critically evaluate and respect different viewpoints in making management decisions, and (4) a high level of proficiency in written and oral communication, particularly with regard to critical evaluation of scientific issues.

There are five options in the major, providing flexibility for concentrations in areas including production and management systems related to agronomic and horticultural crops, plant biotechnology and breeding, crop physiology, ecology, agroecology, and other aspects of general plant science. Students can choose from diverse course offerings in designing a program of study suited to their needs and professional goals.

AGROECOLOGY OPTION:
This option applies an ecological approach to understanding and managing cropping systems to meet societies’ needs while enhancing environmental protection and resource conservation. Students will develop skills to manage agroecosystems for sustainable productivity, profitability and environmental protection by studying plant and soil sciences, ecology, and pest management from a systems perspective. The curriculum prepares students for a wide range of careers in agricultural and ecological fields, sustainable food production, and for graduate studies.

CROP PRODUCTION OPTION:
This option provides students with practical and field-related skills in Agronomy (field crop production and soil management). Students will focus on techniques and knowledge necessary to efficiently and economically manage soils, crops and other farm resources with additional emphasis on pest management and commodity marketing. Courses stress the skills and information needed to work with current production technologies such as seed traits, crop protection chemicals, and fertilizers to improve yield and productivity.

HORTICULTURE OPTION:
This option prepares students to enter the horticultural industry by providing a broad background in courses related to production and physiology of horticultural crops. Additional courses in pest management and business are required. Graduates may work as orchard, greenhouse, garden center, nursery or farm managers, with horticultural and landscape service providers, suppliers, and brokers, with cooperative extension and other government and non-governmental agencies and public and private gardens, or continue with graduate studies.

**PLANT GENETICS AND BIOTECHNOLOGY OPTION:**
This option is a combination of basic science and technology-based classes designed for students who are seeking careers in agricultural sciences, plant breeding, plant molecular genetics and plant biotechnology based industries. It provides students with maximum flexibility in selecting a program of study suited to their needs and to achieve professional goals related to advanced degrees or immediate job placement in the industry. The option provides theoretical and practical skills of plant genetic manipulation relevant to plant biotechnology, plant breeding and genome research.

**PLANT SCIENCE OPTION:**
This option emphasizes the application of the biological sciences to problem-solving in agronomic and horticultural ecosystems. Topic areas include plant biology, plant pathology, plant microbiology, plant biotechnology, plant-insect interactions, horticulture, crop science, plant ecology, and bioenergy. Graduates may find employment in industry, government and academic research programs as technicians and research assistants, or pursue graduate degrees.

For the B.S. Degree in Plant Sciences, a minimum of 120 credits are required.

**GENERAL EDUCATION:** 45 credits
(21-24 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE OPTIONS)

**ELECTIVES:** 0-13 credits

**REQUIREMENTS FOR THE MAJOR:** 83-99 credits
(See includes 21-24 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses and 3 credits of GWS courses; plus 3 GH in Crop Production.)

**COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS):** 33-36 credits

**PRESCRIBED COURSES** (19 credits)
BIOL 110 GN(4), CHEM 110 GN(3), CHEM 111 GN(1) (Sem: 1-4)
SOILS 101 GN(3)[1], ENT 313(2) (Sem: 5-6)
AGECO 457(3)[1], AGECO 461(3)[1] (Sem: 5-8)

**ADDITIONAL COURSES** (14-17 credits)
Select 3-5 credits from MATH 022 GQ(3), MATH 026 GQ(3), MATH 040 GQ(5), MATH 041 GQ(3-4), MATH 110 GQ(4), MATH 111 GQ(2), MATH 140 GQ(4), MATH 141 GQ(4), or MATH 141B GQ(4) (Sem: 1-2)
Select 3-4 credits from STAT 200 GQ(4), STAT 240 GQ(3) or STAT 250 GQ(3) (Sem: 1-2)
Select 3 credits from ENGL 202C GWS(3) or ENGL 202D GWS(3) (Sem: 1-4)
Select 3 credits from AG BM 101 GS(3), ECON 014 GS(3), ECON 102 GS(3), or ECON 104 GS(3) (Sem: 3-4)
Select 1 credit from AGECO 495(1) or ENT 314(1) (Sem: 5-7)
Select 1 credit from AGE 495(1-18), AGRO 495(1-5), HORT 495(1-13), or HORT 496(1-18) (Sem: 5-8)

**REQUIREMENTS FOR THE OPTION:** 50-63 credits

**AGROECOLOGY OPTION:** (60-61 credits)

**PRESCRIBED COURSES** (18 credits)
SOILS 102(1) (Sem: 1-5)
AGECO 201(3)[1] (Sem: 2-6)
AGECO 295(1) (Sem: 2-8)
AGECO/AGRO 434(4) (Sem: 5-7)
PPATH 405(3) (Sem: 5-8)
SOILS 401(3), SOILS 402(3) (Sem: 6-8)

**ADDITIONAL COURSES** (24-25 credits)
Select 3 credits from AGECO/METEO 122 GN(3), AGECO/R SOC 134 GN(3), AGECO 144 GN(3), AGECO 154(2) or AGECO 496(1) (Sem: 1-4)
Select 3 credits from AG 160 GH(3), GEOG 120 GS;IL(3), PHIL 103 GH(3), PHIL 103 GH(3), or PHIL 132 GH(3) (Sem: 1-4)
Select 3 credits from AGECO 028(3)[1] or HORT 101 GN(3)[1] (Sem: 1-5)
Select 3 credits from AGECO 121 GN(3) or BIOL 127 GN(3) (Sem: 3-5)
Select 6 credits from AGRO 423(3), AGRO 425(3), HORT 202(3), HORT 315(3), HORT 431(3), HORT 432(3), HORT 433(3), HORT 450(3), or SOILS 418(3) (Sem: 5-6)
Select 3 credits from BIOL 222(3) or HORT 407(3) (Sem: 5-6)
Select 3-4 credits from AGRO 410W(4), HORT 412W(3), or SOILS 412W(3) (Sem: 6)

**SUPPORTING COURSES AND RELATED AREAS** (18 credits)
Select 18 credits of supporting courses in consultation with adviser. (Sem: 5-8)

**CROP PRODUCTION OPTION:** (61-63 credits)

**PRESCRIBED COURSES** (29 credits)
SOILS 102(1) (Sem: 2-5)
AGECO 201(3), AGECO 295(1) (Sem: 2-6)
PPEM 405(3) (Sem: 3-7)
AGECO 429(2), AGRO 423(3), AGRO 425(3) (Sem: 3-8)
AGECO/AGRO 438(4) (Sem: 5)
HORT 407(3) (Sem: 5-7)
SOILS 401(3), SOILS 402(3) (Sem: 6-8)

ADDITIONAL COURSES (23-25 credits)
Select 3 credits from AGRO 028(3) or HORT 101 GN(3) (Sem: 1-3)
Select 3 credits from AG 160 GH(3), PHIL 013 GH(3), PHIL 103 GH(3), or PHIL 132 GH(3) (Sem: 2-7)
Select 3 credits from AGECO 121 GN(3) or BIOI 127 GN(3) (Sem: 3-5)
Select 3 credits from AG BM 102(3), AG BM 106(3), AG BM 200(3) or AG BM 407(3) (Sem: 3-7)
Select 3 credits from AEE 201 GS(3), AEE 360(3), AEE 460(3), or AEE 465(3) (Sem: 3-7)
Select 2 credits from AGECO 154(2) or SOILS 403(2) (Sem: 4-8)
Select 3-4 credits from AGECO/AN SC/SOILS 418(3), AN SC 201(4), GEOG 160 GS(3), or SOILS 450(3) (Sem: 3-8)
Select 3-4 credits from AGRO 410W(4), HORT 412W(3), or SOILS 412W(3) (Sem: 6)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits of supporting courses in consultation with adviser (Sem: 4-8)

HORTICULTURE OPTION: (54-57 credits)

PRESCRIBED COURSES (30 credits)
HORT 420(3), HORT 445(3), HORT 455(3) (Sem: 1-8)

ADDITIONAL COURSES (24-27 credits)
Select 3 credits from HORT 131(3), HORT 137(3), HORT 138(3), HORT 431(3)*, HORT 432(3)*, or HORT 433(3)* (Sem: 3-8)
Select 3 credits from PPEM 300(3) or PPEM 405(3) (Sem: 4-8)
Select 6-7 credits from HORT 408(4), HORT 431(3), HORT 432(3), HORT 433(3), HORT 450(3), or HORT 453(3) (Sem: 5-8)
Select 3-4 credits from AGRO 438(4) or HORT 238(3) (Sem: 5-8)
Select 9-10 credits from AG BM 101(3), AG BM 200(3), AG BM 407(3), B LAW 243(3), FIN 100(3), MKTG 221(3), SPAN 001(4),
SPAN 002(4), SPAN 003(4) or SPAN 105(4) (Sem: 5-8)

PLANT GENETICS AND BIOTECHNOLOGY OPTION: (55-61 credits)

PRESCRIBED COURSES (34 credits)
PHYS 250(4) (Sem: 3-4)
BIOL 127(3), BIOL 222(3) (Sem: 3-5)
CHEM 210(3) (Sem: 4-5)
PPEM 405(3) (Sem: 5)
CHEM 212(3) (Sem: 5-6)
HORT 407(3) (Sem: 5-7)
AGRO 410W(4), HORT/BIOTC 459(3) (Sem: 6)
B M B 400(2) (Sem: 7)
AGRO/BIOTC 460(3) (Sem: 8)

ADDITIONAL COURSES (21-27 Credits)
Select 3 credits from AGRO 028(3) or HORT 101 GN(3) (Sem: 1-4)
Select 4-6 credits from BIOL 230W GN(4), BIOL 240W GN(4), B M B 211(3) and B M B 212(1), MICRB 201(3) and MICRB 202(2),
MICRB/B M B 251(3) and MICRB 252(3) (Sem: 4)
Select 3-4 credits from BIOL 412(3), BIOL 414(3), BIOL 427(3), BIOL 428(3), BIOL 436(3), BIOL 448(3), ENT 420(3), HORT 445(3), or PPEM 425(4) (Sem: 7)
Select 2-3 credits from BIOL 439(3), BIOTC 479(3), HORT 497(3), IBIOS 571(2), or IBIOS 593(3) (Sem: 7)
Select 3 credits from ENT/VB SC 402W(3), ENT 410(3), PPEM 416(3), or PPEM 425(4) (Sem: 8)
Select 3-4 credits from BIOL 407(3), BIOL 441(3), HORT 402W(3), HORT 412W(3), HORT 420(3), IBIOS 591(1),
PPEM 417(3), or PPEM/E R M 430(3) (Sem: 8)
Select 3 credits from AGRO 423(3), AGRO 425(3), HORT 202(3), HORT 315(3), HORT 431(3), HORT 432(3), HORT 433(3),
HORT 450(3), or SOILS/AGECO/AN SC 418(3) (Sem: 8)

PLANT SCIENCE OPTION: (50-56 credits)

PRESCRIBED COURSES (24 credits)
CHEM 112(3) (Sem: 2-3)
BIOL 127 GN(3), PHYS 250(4) (Sem: 3-6)
CHEM 210(3), CHEM 212(3), CHEM 213B(2) (Sem: 4-5)
BIOL 222(3) (Sem: 5-6)
PPEM 405(3) (Sem: 5-8)

ADDITIONAL COURSES (26-32 credits)
Select 3 credits from AGRO 028(3) or HORT 101 GN(3) (Sem: 1-4)
Select 1 credit from CHEM 113(1) or CHEM 113B(1) (Sem: 2-3)
Select 4-6 credits from B M B 211(3) and B M B 212(1), or BIOL 230W GN(4), or BIOL 240W GN(4), or MICRB 201(3) and
MICRB 202(2), or MICRB 251(3) and MICRB 252(3) (Sem: 3-6)
Select 3-4 credits from BIOL 439(3), ENT 402W(3), ENT 410(3), PPEM 416(3), PPEM 417(3), or PPEM 425(4) (Sem: 5-8)
Select 3-4 credits from BIOL 412(3), BIOL 414(3), BIOL 427(3), BIOL 428(3), BIOL 436(3), BIOL 448(3), ENT/VB SC 402W(3),
ENT 420(3), HORT 445(3), or PPEM 425(4) (Sem: 5-8)
Select 3 credits from AGRO 460(3), BIOL 439(3), HORT 407(3), or HORT 459(3) (Sem: 5-8)
Select 6-7 credits from AGRO 410W(4), AGRO 460(3), BIOL 407(3), BIOL 441(3), BIOL 424(3), HORT 402W(3), HORT 407(3),
HORT 450(3) (Sem: 5-7)
Select 3-4 credits from AGRO 410W(4), HORT 412W(3), or SOILS 412W(3) (Sem: 6)
*Students cannot use the same course more than once as an additional course
A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-05-003

Review Date: 02/24/2015

Political Science

Altoona College (PLSAL)
Capital College (PLSCA)
University Park, College of the Liberal Arts (PL SC)
World Campus

PROFESSOR LEE ANN BANASZAK, Head

The Political Science major offers the student an opportunity to understand not only American federal, state, and local governments, but also the political systems of other nations and the philosophies that underlie them. Courses are offered in American, comparative, and international politics, and in political theory and methodology. Internship opportunities are available.

For the B.A. degree in Political Science, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selections, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits

SUPPORTING COURSES AND RELATED AREAS (36 credits)
(In meeting these requirements, students must take at least one course at any level from the four fields offered in the department: Political Theory/Methodology, American Politics/Public Administration, Comparative Politics, and International Relations)
Select 12 credits from below the 400 level (Sem: 1-6)
Select 15 credits from the 400 level and above in political science (Sem: 3-8)
Select 9 credits in political science or in related disciplines from departmental list of approved courses. Substitutions may be made with the written permission of the faculty adviser. (Sem: 3-8)

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in Political Science and Master's in International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) will provide an opportunity for strong students in Political Science to complete a Master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program would prepare students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master's in International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

The IUG degree in International Affairs and Political Science is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs' existing collaborations and interactions with the College of the Liberal Arts.

Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the
beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application. All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements.
5. Must provide written endorsement from the head of Political Science.

**M.I.A. Requirements for the Integrated B.A./M.I.A.**

The M.I.A. portion of the integrated B.A./M.I.A. will require the completion of a **minimum of 42 credits at the 400 level or higher**, at least 18 of which are from six core courses consisting of INTAF 801(3), 802(3), 803(3), 804(3), 805(3) and INTAF 590(3). The remaining credits are attained through completion of the approved elective courses.

In addition to the core curriculum and elective courses, M.I.A. degree candidates must complete either: (i) a master's paper; or (ii) a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, he/she must complete 3 credits of INTAF 594. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will complete 3 credits of INTAF 595. The student will participate in a supervised internship of sufficient depth and professionalism that will allow the student to experience the integration of his/her curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, M.I.A. degree students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows: (i) four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of C or better using a 4.0 scale); (ii) native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or (iii) performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State's proficiency certification process or another pre-approved proficiency assessment may be used. Language study does not provide credits towards the degree.

### Sample Program of Study

A typical sequence of coursework for a student in the IUG program would appear as follows:

| Year One | Political Science | PL SC 001; PL SC 014 or PL SC 003 |
| Year Two | Political Science | PL SC 003 or PL SC 020; 400-level course |
| Year Three | Political Science | 400 level PL SC class; PL SC 007 or PL SC 017; related course |
| Year Four | Fall Semester | INTAF 801, INTAF 802 and INTAF 803 are required. Additional 400-level PL SC, related course(s), or HIST/GEOG/Economics course(s) may be taken. |
| | Spring Semester | INTAF 804, INTAF 805 and INTAF 590 are required. Additional 400-level PL SC, related course(s), or HIST/GEOG/Economics course(s) may also be taken. |
| Year Five | | 24 credits The following 12 credits may be double counted toward the B.A. and the M.I.A.: PL SC 415(3), PL SC 441(3), PL SC 550(3), PL SC 554(3). |
Tuition Charges, Grant-in-Aid and Assistantships

Students admitted to the School of International Affairs through the IUG with Political Science may be considered to receive financial assistance.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2013
Blue Sheet Item #: 42-03-079
Review Date: 11/19/2013

LA
Date department head updated by Publications: 4/20/10

Premedical-Medical

University Park, Eberly College of Science (P M M)
PROFESSOR RONALD A. MARKLE, in charge

This is a special accelerated program in cooperation with the Sydney Kimmel Medical College (SKMC) at Thomas Jefferson University in Philadelphia whereby exceptional students have the opportunity to earn both the B.S. and M.D. degrees in seven years. Students are selected for this program while they are seniors in high school and must begin their undergraduate studies the fall immediately following their graduation. The first three years of the program are completed at University Park and the next four at SKMC Jefferson. The Penn State B.S. degree in Premedical-Medical is awarded after completion of 96 Penn State credits and successful completion of the first year of the standard curriculum at SKMC Jefferson Medical College.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in GENERAL EDUCATION course selection)

ELECTIVES: 0-1 credit

REQUIREMENTS FOR THE MAJOR: 64-66 credits
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

PRESCRIBED COURSES (46 credits)
CHEM 110 GN(3)[1], CHEM 111 GN(1)[1], CHEM 112 GN(3)[1], CHEM 113 GN(1)[1], MATH 140 GQ(4)[1], MATH 141 GQ(4)[1] (Sem: 1-2)
CHEM 210(3), CHEM 212(3), CHEM 213(2), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214GN(2) (Sem: 3-4)
B M B 401(3)[1], B M B 402(3)[1], BIOL 110 GN(4)[1] (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (10-20 credits)
Select 4-5 credits of life science with lab (Sem: 1-6)
Select 3 credits from program list (Sem: 1-6)
0-8 credits in a foreign language (proficiency demonstrated by examination or course work to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits) (Sem: 1-6)
Select 3-4 credits of life science (Sem: 3-6)

Note: Depending on advanced placement credit and schedule load, it might also be necessary to enroll during one of the other summer sessions before entering SKMC Jefferson Medical College at semester seven.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015
UCA Revision #1: 8/9/06
SC

Publications updated faculty in charge: 7/17/09

Premedicine
This major provides a broad foundation necessary to the understanding of the basic subjects of modern medical studies. The curriculum, which offers a good balance between science and nonscience courses, constitutes an excellent preparation for admission to medical school. It also gives students the freedom to tailor the program to meet their individual needs by permitting a generous number of supporting courses. Specific admission requirements or recommendations of a particular medical school, not already in the required courses of the major, may be included among the supporting courses. Many students also use their supporting courses to pursue a minor.

In order to be eligible for entrance to the Premedicine major, a student must have: 1) attained at least a 3.20 cumulative grade-point average; and 2) completed BIO 110 GN(4), BIO 230W GN(4), CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), MATH 140 GQ(4), MATH 141 GQ(4) and earned a grade of C or better in each of these courses.

THREE-YEAR ALTERNATIVE: A student may also become eligible for the Bachelor of Science degree in this major upon satisfactory completion of:

a. A total of 96 credits, including General Education credits in Writing/Speaking, Health Sciences and Physical Education, and Arts, Humanities, and Social and Behavioral Sciences; 8 credits in a single foreign language; BIO 110 GN(4), BIO 230W GN(4), CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), CHEM 212(3), CHEM 213(2), MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2) and PHYS 214 GN(2).

b. The first year of an accredited medical or dental postgraduate program.

For the B.S. degree in Premedicine, a minimum of 126 credits is required, with at least 18 credits at the 400 level.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 99 credits
(This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GHA courses.)

PRESCRIBED COURSES (59 credits)
CHEM 210(3), CHEM 212(3), CHEM 213(2), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2) and PHYS 214 GN(2) (Sem: 3-6)

ADDITIONAL COURSES (16-20 credits)
Select 4-5 credits from BIO 220W GN(4), BIO 240W GN(4), MICRB 201(3), MICRB 202(2), SEM: 3-8
Select 3-4 credits from STAT 200 GQ(4), or STAT 250 GQ(3) (Sem: 3-8)
Select 4-5 credits[1] from BIO 421(4), or BIO 437(4), or BIO 472(3), and BIOL 473(2); MICRB 412(3), and MICRB 422(2) (Sem: 5-8)
Select 5-6 credits[1] from BM B 400(2-3), BM B 401(3), BM B 402(3), or CHEM 450(3), CHEM 452(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (26-30 credits)
Select 0-8 credits in a foreign language (proficiency demonstrated by examination or course work to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits) (Sem: 1-8)
Select 18-30 credits from program list (A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation. Students may apply 6 credits of ROTC.) (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

UCA Revision #1: 8/9/06

UCA Revision #2: 7/30/07

SC

Publications updated faculty in charge: 7/17/09

Psychology
This major is designed for students who want to learn about behavior, normal and abnormal, how it is studied, and its relation to applied areas. Students are encouraged to conduct research with members of the faculty and/or take a practicum in an applied setting. Graduates are equipped for various positions in human service agencies, industrial settings, or laboratories. Others go on to professional school, e.g., medical school, law school, or to continue their training in psychology working toward a master's or a doctoral degree. Majors may elect either a Bachelor of Arts or a Bachelor of Science program.

In order to be eligible for entrance to the PSYBA major, a student at any location must have: 1) attained at least a 2.00 cumulative grade-point average; 2) completed PSYCH 100 GS(3) with a grade of C or better; 3) completed STAT 200 GQ(4) or PSYCH 200 GQ(4), at least 3 credits of GQ courses (not including STAT 200), and at least 3 credits of GS courses (not including PSYCH 100) with a grade of C or better.

For the B.A. degree in Psychology, a minimum of 123 credits is required

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
( Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 13 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 47 credits[1]
( This includes 6 credits of General Education GQ courses.)

PREScribed COURSES (13 credits)
PSYCH 100 GS(3) (Sem: 1-4)
PSYCH 105(3) (Sem: 2-5)
PSYCH 301W(4) (Sem: 3-6)
PSYCH 490(3) (Sem: 7-8)

ADDITIONAL COURSES (34 credits)
Select 6 credits of GQ courses (Sem: 1-4)
PSYCH 200 GQ(4) or STAT 200 GQ(4) (Sem: 3-4)
Select 12 credits of 200-level PSY courses (not to include PSYCH 294, PSYCH 296, or PSYCH 297). At least 3 credits must be from each group a, b, and c:
  a. PSYCH 253 GS(3), PSYCH 256 GS(3), PSYCH 260(3), PSYCH 261 GS(3) (Sem: 3-8)
  b. PSYCH 212 GS(3), PSYCH 221 GS(3), PSYCH 231 GS-US(3), PSYCH 238 GS(3) (Sem: 3-8)
  c. PSYCH 243 GS(3), PSYCH 269(3), PSYCH 270(3), PSYCH 281 GS(3) (Sem: 3-8)
Select 12 credits of PSY courses at the 400 level (not to include PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496) (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2004

Blue Sheet Item #: 32-06-181

Review Date: 4/13/04

UCA Revision #1: 8/14/06

LA

Psychology

University Park, College of the Liberal Arts (PSYBS) World Campus

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.
This major is designed for students who want to learn about behavior, normal and abnormal, how it is studied, and its relation to applied areas. Students are encouraged to conduct research with members of the faculty and/or take a practicum in an applied setting. Graduates are equipped for various positions in human service agencies, industrial settings, or laboratories. Others go on to professional school, e.g., medical school, law school, or to continue their training in psychology working toward a master's or a doctoral degree. Majors may elect either a Bachelor of Arts or a Bachelor of Science program.

The B.S. degree program requires more course work in the sciences than the B.A. program, and students may select courses from one of four areas--mathematics/computer science, statistics, business, or biology--which may be taken instead of a foreign language.

In order to be eligible for entrance to the PSYBS major, a student at any location must have: 1) attained at least a 2.00 cumulative grade-point average; 2) completed PSYCH 100 GS(3) with a grade of C or better; 3) completed STAT 200 GQ(4) or PSYCH 200 GQ(4), at least 3 credits of GQ courses (not including STAT 200), and at least 3 credits of GS courses (not including PSYCH 100) with a grade of C or better.

For the B.S. degree in Psychology, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(9 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 10-13 credits

REQUIREMENTS FOR THE MAJOR: 74-77 credits
(This includes 9 credits of General Education courses: 3 credits of GWS courses and 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 50 credits

PRESCRIBED COURSES (16 credits)
PSYCH 100 GS(3) (Sem: 1-4)
PSYCH 105(3) (Sem: 2-5)
ENGL 202A GWS(3) (Sem: 3-4)
PSYCH 301W(4) (Sem: 3-6)
PSYCH 490(3) (Sem: 7-8)

ADDITIONAL COURSES (34 credits)
Select 6 credits of GQ courses (Sem: 1-4)
PSYCH 200 GQ(4) or STAT 200 GQ(4) (Sem: 3-4)
Select 12 credits of 200-level PSY courses (not including PSYCH 294, PSYCH 296, or PSYCH 297). At least 3 credits must be from each group a, b, and c:
a. PSYCH 253 GS(3), PSYCH 256 GS(3), PSYCH 260(3), PSYCH 261 GS(3) (Sem: 3-8)
b. PSYCH 212 GS(3), PSYCH 221 GS(3), PSYCH 231 GS,US(3), PSYCH 238 GS(3) (Sem: 3-8)
c. PSYCH 243 GS(3), PSYCH 269(3), PSYCH 270(3), PSYCH 281 GS(3) (Sem: 3-8)
Select 12 credits of PSYCH courses at the 400 level (not including PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496) (Sem: 3-8)

REQUIREMENTS FOR THE OPTION: 24-27 credits

LIFE SCIENCES OPTION: (24 credits)

ADDITIONAL COURSES (15 credits)
Select 15 credits from at least three different groups a, b, c, and d, including at least 3 credits from each of three different groups:
--a. Genetics: ANTH 218 GN(4), ANTH 460(3), ANTH 473(3), ANTH 473W(3); BIOL 133 GN(3) or BIOL 222(3) (Sem: 3-6)
--b. Biological Anthropology: ANTH 021 GN(3), ANTH 022 GN(3), ANTH 040(3), ANTH 401(3), BB H 410(3), H P A 310(3), NUTR 251(3) (Sem: 3-6)
--c. Biobehavioral Implications: Any BB H course, except BB H 310(3); HD FS 417(3), HD FS 468(3), RHS 100(3), RHS 300(3), RHS 403(3) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits in natural sciences from department list (Sem: 1-8)
Select 6 credits in social and behavioral sciences from department list (Sem: 1-8)

BUSINESS OPTION: (24 credits)

ADDITIONAL COURSES (15 credits)
Select 15 credits from at least three different groups. Three (3) credits in any category can be replaced by internship (L
1. a. ECON 102 GS(3), ECON 104 GS(3), ECON 014 GS(3), ECON 302 GS(3) or higher-numbered ECON course; PHIL 420(3), PL SC 412(3), PL SC 444(3), PL SC 481(3), PL SC 490(3) (Sem: 3-6)
b. B A 301(3), FIN 301(3) or any higher-numbered FIN course (Sem: 3-6)
c. B A 303(3), MKTG 301(3) or any higher-numbered MKTG course (Sem: 3-6)
d. ACCTG 211(4) (Sem: 3-6)

2. a. Management: H P A 057(3), H P A 101(3), H P A 301(3) or any higher-numbered H P A course, B A 304(3), MGMT 301(3) or any higher-numbered MGMT course (Sem: 3-6)
c. Labor relations: LER 100 GS(3), any LER 400 or higher (Sem: 3-6)
d. Communication: CAS 352(3), CAS 450W(3), CAS 452(3), ENGL 419(3), ENGL 460(3), ENGL 479(3), LER 464(3) (Sem: 3-6)

c. History: HIST 423 IL(3), HIST 425 IL(3), HIST/LER 458Y US(3) (Sem: 3-6)
d. Technology: IST 110(3)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits in arts/humanities from department list (Sem: 1-8)
Select 3 credits in natural sciences from department list (Sem: 1-8)
Select 3 credits in social and behavioral sciences from department list (Sem: 1-8)

NEUROSCIENCE OPTION: (24-27 credits)

ADDITIONAL COURSES (15-18 credits)
PSYCH 260(3) (also counts in category a of COMMON REQUIREMENTS FOR THE MAJOR) (Sem: 3-6)
Select 15 credits from groups a, b, c, d, and e, including at least 3 credits from each of four different groups:
--a. Genetics: BIOL 133 GN(3), BIOL 110 GN(4), or BIOL 222(3) (Sem: 3-6)
--b. Physiology: BIOL 141 GN(3) or BIOL 472(3) (Sem: 3-6)
--c. Organic Chemistry: CHEM 202(3), CHEM 210(3), or CHEM 212(3) (Sem: 3-6)
--d. Cell Biology: BIOL 230W GN(4), BIOL 469(3), MICRB 106 GN(3), MICRB 201(3), MICRB 251(3) (Sem: 3-6)
--e. Other Topics: BIOL 240W GN(4), BIOL 177 GN(3), BIOL 409(3), BB H 470(3) (Sem: 3-6)

NOTE: Students planning to apply to medical school should select this option and choose courses to meet the following minimal requirements for most medical schools: BIOL 110 GN(4) and BIOL 230W GN(4) or BIOL 240W GN(4); CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), CHEM 212(3), and CHEM 213(2); PHYS 211 GN(4) and PHYS 212 GN(4), or PHYS 250 GN(4) and PHYS 251 GN(4).

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 6 credits in natural sciences from department list (Sem: 1-8)
Select 3 credits in social and behavioral sciences from department list (Sem: 1-8)

QUANTITATIVE SKILLS OPTION: (24 credits)

ADDITIONAL COURSES (15 credits)
Select a total of 15 credits from groups a, b, c, and d:
--a. Select at least 3 credits from MATH 018 GQ(3), MATH 110 GQ(4), MATH 111 GQ(2), MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 3-6)
--b. (Optional) Select 3 credits from CMPSC 101 GQ(3), CMPSC 121 GQ(3), CMPSC 201 GQ(3), CMPSC 202 GQ(3), CMPSC 203 GQ(4) (NOTE: Students may take only one of the courses in category b for credit.) (Sem: 3-6)
--c.1. Select 3 credits from STAT 318(3), STAT 414(3), STAT 418(3) (NOTE: Students may take only one of the courses in category c.1. for credit.) (Sem: 5-6)
--c.2. Select at least 3 credits from STAT 319(3), STAT 415(3), STAT 416(3), STAT 460(3), STAT 462(3), STAT 464(3) (Sem: 5-6)
--d. CAS 483(3), CMPSC 122(3), PSYCH 404(3), PSYCH 405(3) (Sem: 3-6)

NOTE: Students may fulfill the requirements of the Quantitative Skills option by completing a minor in either Statistics or Computer Science and Engineering in lieu of the course requirements listed above. Students choosing this option are encouraged to consult with an adviser designated by the Department of Psychology to determine the suitability of particular courses given their quantitative backgrounds. Other courses with advanced quantitative content may be substituted in category d with adviser's approval.

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits in arts/humanities from department list (Sem: 1-8)
Select 6 credits in social and behavioral sciences from department list (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2016
Recreation, Park, and Tourism Management

University Park, College of Health and Human Development (RPTM)

PROFESSOR PETER NEWMAN, Head of the Department

Through this program, students can prepare for supervisory and administrative positions in public or private agencies at the federal, state, and local levels. These include, but are not limited to, park systems, environmental centers, resorts, university intramural and sport club programs, event management businesses, recreation services for the armed forces, and therapeutic recreation programs in hospitals and health care facilities. Three options are offered: (1) Commercial and Community Recreation Management, (2) Golf Management, (3) Outdoor Recreation.

Students who have completed 28 credits with a 2.00 cumulative grade-point average are eligible for entrance into the major after filing a written application. First-year students are admitted directly into the Golf Management option at the University Park campus only. In addition to the University’s academic requirements, each student admitted to the Golf Management option must have a playing proficiency represented by a minimum golf handicap of 12 or lower. This must be certified in writing by a PGA member or golf coach.

COMMERCIAL AND COMMUNITY RECREATION MANAGEMENT OPTION: This option focuses on management in the private/commercial, non-profit, and public sectors of recreation/leisure services. The private/commercial focus will be of interest to students seeking careers in a variety of commercial settings such as resorts; theme parks, convention centers; sports and fitness facilities, including arenas and stadiums; tourism promotion/planning agencies; and employee recreation departments within corporations. This focus will also appeal to students wishing to become entrepreneurs. For those interested in the community, public, or non-profit sectors, this option prepares students for positions within municipal, state, and federal government agencies; recreation divisions of the armed services; YMCA agencies; United Way agencies; scouting organizations; university-affiliated units such as student unions, intramural and alumni services; and other non-profit organizations.

GOLF MANAGEMENT OPTION: This option helps prepare students to manage golf facilities within the municipal, military, public, and private sectors. In addition to the core curriculum in Recreation, Park, and Tourism Management, this option includes a strong basic education in business coupled with course work in turf management and hospitality. Each student completes sixteen months of Co-op education under the supervision of a Class A member of the Professional Golfers’ Association of America.

OUTDOOR RECREATION OPTION: This option helps prepare students for careers in environmental interpretation, adventure-based programming, or facilities and resource management. One track focuses upon natural and cultural history interpretation, including environmental education. Another track emphasizes adventure-based program leadership, including team-building facilitation. The third track focuses on the management of park and recreation facilities and resources. The outdoor recreation option would be of interest to students seeking employment in a variety of recreation and park venues (local, state, and national) offering outdoor activities to the public.

For the B.S. degree in Recreation, Park, and Tourism Management, a minimum of 120 credits is required.

Per Senate Policy 83.80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. RPTM requires students to complete 24 credits for the major through courses taken at University Park. Courses taken at other Penn State campuses may not be counted toward this 24 credit minimum. For more information, check the Recommended Academic Plan for this major.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3-7 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 8-13 credits

REQUIREMENTS FOR THE MAJOR: 65-70 credits
(This includes 3-7 credits of General Education courses: 3-4 credits of GQ courses; 0-3 credits of GN courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 26-27 credits

PRESCRIBED COURSES (23 credits)[1]
RPTM 101(2), RPTM 120 GS(3), RPTM 236(3) (Sem: 1-4)
RPTM 277 US(3), RPTM 356(3) (Sem: 3-6)
RPTM 410(3), RPTM 460(3) (Sem: 5-8)
RPTM 433W(3) (Sem: 7-8)

ADDITIONAL COURSES (3-4 credits)
EDPSY 101 GQ(3) or STAT 100 GQ(3) or STAT 200 GQ(4) (Sem: 3-6)

REQUIREMENTS FOR THE OPTION: 39-43 credits

COMMERCIAL AND COMMUNITY RECREATION MANAGEMENT OPTION: (39-40 credits)
PRESCRIBED COURSES (21 credits)
RPTM 210(2), RPTM 300Y(3), RPTM 394(1) (Sem: 3-6)
RPTM 415(3), RPTM 495A(12) (Sem: 5-8)

ADDITIONAL COURSES (6-7 credits)
Select 6-7 credits from ACCTG 211(4) or HM 335(3), B A 250(3), FIN 100(3), HM 201(3), MGMT 100(3), MKTG 150(3), MKTG 221(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits from department list in consultation with faculty adviser (Sem: 3-8)

GOLF MANAGEMENT OPTION: (42-43 credits)
PRESCRIBED COURSES (25 credits)
B LAW 243(3), MGMT 100(3), RPTM 210(2) [1] (Sem: 3-6)
HM 336(3), RPTM 360(3) [1] (Sem: 5-6)
HM 318(2), TURF 100(3) (Sem: 5-10)
HM 466(3), RPTM 415(3) [1] (Sem: 9-10)

ADDITIONAL COURSES (17-18 credits)
Select 3-4 credits from ACCTG 211(4) or HM 335(3) (Sem: 3-6)
Select 14 credits from RPTM 295A(1-4) [1], RPTM 395B(1-4) [1], RPTM 495A(1-4) [1], RPTM 495D(1-4) [1] (Sem: 3-8)

OUTDOOR RECREATION OPTION: (41-42 credits)
PRESCRIBED COURSES (20 credits) [1]
RPTM 320(3), RPTM 394(1) (Sem: 3-4)
RPTM 470(3), RPTM 480(1), RPTM 495A(12) (Sem: 5-8)

ADDITIONAL COURSES (21-22 credits)
Select 6 credits from courses with the following abbreviations: E R M, FOR, GEOSC, W F S (Sem: 3-6)
Select among: a, b, or c (15-16 credits)

a. Environmental Interpretation Emphasis:
Select 12 credits from RPTM 325(3) [1], RPTM 326(3) [1], RPTM 327(3) [1], RPTM 425(3) [1], RPTM 430(3) [1] (Sem: 5-8)
Select 3 credits from department list, in consultation with faculty adviser (Sem: 3-8)

b. Adventure-based Programming Emphasis:
Select 6-9 credits from RPTM 230(3) [1], RPTM 330(3) [1], RPTM 440(3) [1] (Sem: 3-8)
Select 0-3 credits from RPTM 325(3) [1], RPTM 334(3) [1], RPTM 430(3) [1] (Sem: 3-8)
Select 6 credits from department list, in consultation with faculty adviser (Sem: 3-8)

c. Park Management Emphasis:
RPTM 334(3) [1], RPTM 435(3) [1] (Sem: 6-8)
Select 6-7 credits from ACCTG 211(4) or HM 335(3), HM 201(3), MGMT 100(3), MGMT 341(3), MKTG 221(3) (Sem: 3-6)
Select 3 credits from department list, in consultation with faculty adviser (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 39-01-103
Review Date: 08/24/2010
UCA Revision #1: 9/1/06

Rehabilitation and Human Services

Penn State Abington (RHSAB)
Penn State Berks (RHISBL)
University College: Penn State Hazleton, Penn State Lehigh Valley, Penn State Wilkes-Barre (RHSCC)
University Park, College of Education (RHS)

PROFESSOR JAMES HERBERT, Undergraduate Program Coordinator

This major helps prepare students for entry-level positions in a variety of human service settings, particularly settings that provide services to persons with physical, emotional, or mental disabilities. Graduates pursue employment in a variety of settings including rehabilitation centers, drug and alcohol programs, senior citizens centers, community mental health programs, mental retardation programs, corrections systems, and hospitals. Increasing opportunities are available in private for-profit insurance programs for the industrially injured, and in employee assistance programs within business and industry. Well-planned use of electives and internships allows for specialization. The full-semester (15-credit) internship is provided under the supervision of professionals in human service agencies. These intensive “hands-on” experiences are frequently avenues for employment since the internship is completed during the senior year. Students may not go on internship until they have successfully completed all other course work. Students are encouraged to participate in volunteer experiences that provide opportunities to work with people with disabilities. Students are encouraged to declare a minor in a related area and should be discussed with the student’s adviser. The major also helps prepare students for graduate study in many human service professional disciplines such as rehabilitation counseling, school counseling, occupational therapy, physical therapy and social work.

Baccalaureate degree candidates must have a minimum 2.0 GPA to be admitted to the Rehabilitation and Human Services
(RHS) major; thereafter, students must earn a C or better in all RHS required courses.

For the B.S. degree in Rehabilitation and Human Services, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12-14 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR: 
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 17-20 credits

REQUIREMENTS FOR THE MAJOR: 70-72 credits
(This includes 12-14 credits of General Education courses: 6 credits of GS courses; 3-4 credits of GQ courses; 3-4 credits of GN courses.)

PRESCRIBED COURSES (55 credits)
PSYCH 100 GS(3), RHS 100 GS:US(3) (Sem: 1-4)
PSYCH 270(3), SOC 001 GS(3), SOC 119(4) (Sem: 1-6)
RHS 300(3)[1], RHS 301(3)[1], RHS 302(3)[1], RHS 303(3)[1], RHS 400W(3)[1], RHS 401(3)[1], RHS 402(3)[1], RHS 403(3)[1], RHS 495A(15) (Sem: 5-8)

ADDITIONAL COURSES (9-11 credits)
EDPSY 010 GS(3), HD FS 239 GS(3), or PSYCH 212 GS(3) (Sem: 1-2)
Select 3-4 credits from ANTH 021 GN(3), BI SC 001 GN(3), BI SC 002 GN(3), BI SC 003 GN(3), BI SC 004 GN(3), BIOL 133 GN(3), BIOL 110 GN(4), or BIOL 141 GN(3) (Sem: 1-6)
STAT 100 GQ(3) or STAT 200 GQ(4) or EDPSY 101 GQ(3) (Sem: 1-6)

SUPPORTING AND RELATED COURSES (6 credits)
Select 6 credits from CRIM, BB H, HD FS, KINES, PSYCH, or SOC (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better in this course, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-082

Review Date: 02/19/2013

UCA Revision #: 9/1/06

PIC updated: 2/13/12

ED

Risk Management

University Park, Smeal College of Business (R M)

PROFESSOR Austin J. Jaffe, Chair, Department of Risk Management

The Risk Management major prepares students for careers in a wide range of private industries and public service agencies involving such areas as operations, property development, financial strategy, and government. The major is integrative in nature by crossing traditional business boundaries while offering specific areas of study in actuarial science, enterprise risk management, and real estate. High profile risks are faced by leaders and managers up and down the corporate ladder and require specialized skills, knowledge and preparation. The Risk Management major prepares students for this along with a chance to study risk from three different perspectives by offering specialty courses along with a common pool of risk management courses. This structure assures that the students in the risk management major are equipped with the common tools of risk analysis while at the same time permitting the students to tailor the specifics of their training through the selection of a particular option.

ACTUARIAL SCIENCE OPTION: The courses in the Actuarial Science option stress the application of mathematical and statistical concepts to the measurement of life and other contingencies, while at the same time giving the student a broad understanding of the business environment. Students in the Actuarial Science option are encouraged to begin the series of professional examinations leading to Associateship and Fellowship in either the Society of Actuaries (A.S.A./F.S.A.) or the Casualty Actuarial Society (A.C.A.S./F.C.A.S.).

Entrance requirements to the Actuarial Science Option -- To be eligible for entrance into the Actuarial Science option, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4)[1]; ECON 102 GS(3); ENGL 015 GWS(3) or ENGL 030 GWS(3); FIN 301(3)[1]; MATH 140 GQ(4)[1]; MATH 141(4)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1]; SCM
200 QG(4) or STAT 200 QG(4). These courses must be completed by the end of the semester during which
the entrance to major process is carried out.
3. A minimum cumulative grade point average of 3.20 prior to and through to the end of the semester during which
the entrance to major process is carried out.

ENTERPRISE RISK MANAGEMENT OPTION: The Enterprise Risk Management Option prepares students to identify,
quantify and qualify the regulatory, legal, financial and contractual aspects of enterprise risk; the management of such
risks; and the application of risk financing techniques to control risk exposures in organizations. Emphasis is also placed
on the understanding of the principles and risks underlying complex business contracts.

Entrance requirements to the Enterprise Risk Management Option --To be eligible for entrance into the Risk
Management major and the Enterprise Risk Management Option, a degree candidate must be enrolled in the Smeal
College of Business or the Division of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the
bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4); ECON 102 GS(3); ENGL 015 GWS(3) or
ENGL 030 GWS(3); FIN 301(3); MATH 110 QG(4) or MATH 140 QG(4); MGMT 301(3); and MKTG 301(3). These courses must be completed by the end of the semester during which
the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve
administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College
of Business. In each case, however, academic requirements are established for admission. For information on
enrollment controls, consult the Smeal College of Business Web site (http://www.smeal.psu.edu).

REAL ESTATE OPTION: This option is designed to prepare the student for a wide range of professional opportunities in
corporate real estate management, real estate brokerage, appraisal, property management, mortgage lending and
banking, development, and governmental service.

Entrance requirements to the Real Estate Option --To be eligible for entrance into the Risk Management major and the
General or Real Estate Options, a degree candidate must be enrolled in the Smeal College of Business or the Division
of Undergraduate Studies and satisfy the following requirements for entrance:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the
bulletin, including approximately 60 credits of course work.
2. Complete the following entrance to major requirements: ACCTG 211(4); ECON 102 GS(3); ENGL 015 GWS(3) or
ENGL 030 GWS(3); FIN 301(3); MATH 110 QG(4) or MATH 140 QG(4); MGMT 301(3); and MKTG 301(3). These courses must be completed by the end of the semester during which
the entrance to major process is carried out.
3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve
administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College
of Business. In each case, however, academic requirements are established for admission. For information on
enrollment controls, consult the Smeal College of Business Web site (http://www.smeal.psu.edu).

For the B.S. degree in Risk Management, a minimum of 120 credits is required (at least 15 credits must be taken at the
400 level).

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection.)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 11-14 credits

REQUIREMENTS FOR THE MAJOR: 73-76 credits
(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; and 3 credits of
GS.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 45 credits

PRESCRIBED COURSES (37 credits)
ACCTG 211(4), ECON 102 GS(3), FIN 301(3), MGMT 301(3), MKTG 301(3) (Sem: 1-4)
B A 342(3), B A 471(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), MIS 204(3), R M 301(3) (Sem: 5-8)

ADDITIONAL COURSES (4 credits)
SCM 200 QG(4) or STAT 200 QG(4) (Sem: 1-2)

SUPPORTING COURSES AND RELATED AREAS (4 credits)
Select 4 credits: Attainment of 12th credit level proficiency in a single foreign language (4 credits). Proficiency must be
demonstrated by either examination or course work. (Sem: 1-4)

REQUIREMENTS FOR THE OPTION: 28-31 credits

ACTUARIAL SCIENCE OPTION: (31 credits)
PRESCRIBED COURSES (28 credits)
MATH 140 GQ(4)\(^[1]\), MATH 141(4)\(^[1]\) (Sem: 1-2)
MATH 231(2)\(^[1]\), STAT 414(3)\(^[1]\) (Sem: 3-5)
R M 320W(3)\(^[1]\), R M 410(3)\(^[1]\), R M 411(3)\(^[1]\) (Sem: 5-6)
R M 412(3)\(^[1]\), R M 430(3)\(^[1]\) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)
R M 401(3)\(^[1]\) or R M 420(3)\(^[1]\) (Sem: 7-8)

ENTERPRISE RISK MANAGEMENT OPTION: (28 credits)
PRESCRIBED COURSES (18 credits)
R M 320W(3)\(^[1]\) (Sem: 5-6)
B LAW 441(3)\(^[1]\), FIN 406(3)\(^[1]\), SCM 301(3)\(^[1]\) (Sem: 5-8)
R M 405(3)\(^[1]\), R M 440(3)\(^[1]\) (Sem: 6-8)

ADDITIONAL COURSES (4 credits)
MATH 110 GQ(4)\(^[1]\) or MATH 140 GQ(4)\(^[1]\) (Sem: 1-2)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select six credits of supporting coursework from an approved department list. (Sem: 5-8)

REAL ESTATE OPTION: (28 credits)
PRESCRIBED COURSES (15 credits)
R M 330W(3)\(^[1]\) (Sem: 5-6)
R M 450(3)\(^[1]\), R M/FIN 460(3)\(^[1]\), R M/FIN 470(3)\(^[1]\), SCM 301(3)\(^[1]\) (Sem: 6-8)

ADDITIONAL COURSES (7 credits)
MATH 110 GQ(4)\(^[1]\) or MATH 140 GQ(4)\(^[1]\) (Sem: 1-2)
Select 3 credits \(^[1]\) from FIN 406(3), R M 420(3), R M/B LAW 424(3), R M/B LAW 425(3), R M 480(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select six credits of supporting coursework from an approved department list. (Sem: 5-8)

\(^[1]\) A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015

Russian

University Park, College of the Liberal Arts (RUS)

SENIOR LECTURER IRINA MIKAELIAN, Director

The B.A. in Russian provides the student with a command of spoken and written Russian and a general knowledge of the literature and culture of the Russian people. No previous study of Russian is required for admission to the major. Study in Russia under the University's Education Abroad Program is available for qualified students. Students are advised to combine their study of Russian with another foreign language, English, history, political science, the Russian Area Studies minor, the Business/Liberal Arts minor, or the Linguistics minor. Graduates of this program have found employment in international business, the U.S. government, in the educational and publishing fields, and in the travel industry.

For the B.A. degree in Russian, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 23 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 28 credits\(^[1]\)

PRESCRIBED COURSE (13 credits)
Russian Translation

University Park, College of the Liberal Arts (RUS T)

SENIOR LECTURER IRINA MIKAELIAN, Director

This major is designed to offer, within the context of a liberal education, specialized skills in translation from the Russian language. The curriculum is career-oriented and requires competence in a field or fields in addition to the language skill. Students will select such a field or fields in accordance with their special interests and in consultation both with the adviser and with persons directly involved with the field chosen.

For the B.S. degree in Russian Translation, a minimum of 124 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 20 credits

REQUIREMENTS FOR THE MAJOR: 59-71 credits[1]

PRESCRIBED COURSES (17 credits)
RUS 204 IL(4), RUS 214 IL(4), RUS 304 IL(3), RUS 400 IL(3), RUS 412 IL(3) (Sem: 3-8)

ADDITIONAL COURSES (18 credits)
Select 3 credits from each category:
a. ENGL 415(3), ENGL 416(3), ENGL 417(3), ENGL 418(3), ENGL 419(3), ENGL 421(3), or CMLIT 410(3) (Sem: 5-8)
b. HIST 141 GH(3), or HIST 434 IL(3) (Sem: 3-8)
c. RUS 100 GH;IL(3), RUS 110 GH;IL(3), RUS 120 GH;IL(3), RUS 141W IL(3), or RUS 142Y IL(3) (Sem: 5-8)
d. PL SC 413(3) (Sem: 7-8)
e. RUS 426 IL(3) or RUS 427 IL(3) (Sem: 7-8)
f. RUS 450 IL(3) or RUS 460 IL(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (24-36 credits)
Proficiency in Russian must be demonstrated by either course work or examination equivalent to the completion of 12 credits of course work (0-12) (Sem: 3-6)
Select a minimum of 24 credits in a field (or fields) in which the student plans to specialize as a translator (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2002
Science

Abington College (SCIAB)
Altoona College (SCIAL)
Berk's College (SCIBL)
Capital College (SCICA)
University College (SCICC): Penn State Worthington-Scranton, Penn State York
University Park, Eberly College of Science (SC BS)
Integrated Five-Year Science/Business M.B.A. Program (SCBUS)

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

PROFESSOR RONALD MARKLE, in charge

The Science major is an interdisciplinary degree that aims to provide a broad, general education in science. The bachelor of science (B.S.) curriculum is designed specifically for students who have education goals relating to scientific theory and practice and who require a high degree of flexibility to obtain their educational objectives. After completing foundation courses in calculus, chemistry, physics, and the life sciences, students will select additional science courses from designated areas. A large number of supporting credits permit students to readily include significant breadth or specialization into their undergraduate curriculum. Some examples include minors in business, computer and information science, education, kinesiology, or other fields. The degree allows students throughout the Commonwealth to become familiar with both the theory and the practice of science. It can help prepare students for various careers in pharmaceutical, biotechnical, chemical, medical, and agricultural industries. The degree can also be tailored to meet the specific requirements of professional programs such as medical, dental, or pharmacy schools. The General Science option of the B.S. Science degree allows for the most flexibility. Achievement in a more specialized set of goals can be met by selecting one of the other B.S. options offered: the Biological Sciences and Health Professions option, the Legal Studies, Government Service, Public Policy option, the Life Sciences option, the Mathematical Sciences option, or the Physical Sciences option. Not all of those options are available at all locations, and there are minor distinctions of the core curriculum at some locations, so see the Science program director at your College for further details.

In order to be eligible for entrance to the Science major, a student at any location must have: 1) attained at least a 2.00 cumulative grade-point average; 2) completed MATH 140 GQ(4) with a grade of C or better; 3) completed at least two of the following courses, BIOL 110 GN(4); CHEM 110 GN(3); CHEM 111(1), CHEM 112 GN(3), CHEM 113 GN(1), CMPSC 203 GQ(4), MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2), or PHYS 250 GN(4), PHYS 251 GN(4), STAT 200 GQ(4); an additional life science course selected from B M B 211(3), B M B 251(3), or MICRB 201(3); and 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level.

For the B.S. degree in Science, a minimum of 124 credits is required, with at least 15 credits at the 400 level.

TWO-YEAR PREPROFESSIONAL PREPARATION: The first two years of the Science major (62 credits) can meet the pre professional needs of those interested in admission to some schools of pharmacy, physical therapy, optometry, nursing, and physician assistant training. Successful students can then transfer after two years of undergraduate study to the professional school to which they are admitted. Note, however, that no Penn State degree can be awarded after only two years (62 credits) of study in the Science major. Also, note that the abbreviated two-year curriculum alone does not prepare students for admission to professional schools of general medicine, veterinary medicine, or dental medicine. Consult with your college's health sciences professional adviser for additional information.

ACCELERATED SCIENCE B.S./M.B.A. PROGRAM: Students admitted to this special cooperative program between the Eberly College of Science and The Smeal College of Business will be able to combine a Bachelor of Science degree in the Science major, with a Master of Business Administration degree. Highly motivated students, who enter the University with a sufficient number and proper distribution of AP credits, will have the opportunity to complete the requirements for both programs within five years. The B.S. degree in the Science major General Science option, will be conferred upon satisfactory completion of:

1. A minimum of 112 acceptable undergraduate credits, which must include:
   1. (30 credits) The University's General Education requirements in the areas of Writing and Speaking (9), Health and Physical Activity (3), Arts (6), Humanities (6), and Social and Behavioral Sciences (6). (Note: Students will be required to take ECON 102 GQ(3) and ECON 104 GS(3) in order to satisfy the Social and Behavioral Sciences requirement. The University's General Education requirements in the areas of Quantification and Natural Sciences will be satisfied by course work listed under heading "c".)
   2. The University's First-Year Seminar, United States Cultures, International Cultures, and Writing Across the Curriculum requirements. (Note: These requirements may be double counted in order to satisfy other requirements in the program.)
   3. (53-57 credits) BIOL 110 GN(4), CHEM 110 GN(3), CHEM 111(1), CHEM 112 GN(3), CHEM 113 GN(1), CMPSC 203 GQ(4), MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2), or PHYS 250 GN(4), PHYS 251 GN(4), STAT 200 GQ(4); an additional life science course selected from B M B 211(3), B M B 251(3), or MICRB 201(3); and 14 additional credits of course work from the Eberly College of Science, with at least nine credits at the 400 level.
   4. (0-8 credits) Demonstration of second semester proficiency in a single foreign language.
   5. (3-9 credits) SC 295(1-3), SC 395(1-3), SC 495(1-3) (Note: Students must complete three Eberly College of Science Cooperative Education experiences, including at least one experience which is a full semester in length.)
   6. (4 credits) ACCTG 211(4)
   7. (4-22 credits) Supporting courses and related areas selected from the program list.
   8. The first semester of course work in The Smeal College of Business M.B.A. program (i.e., a minimum of 12 graduate
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in GENERAL EDUCATION course selection or SUPPORTING COURSES AND RELATED AREAS)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection or SUPPORTING COURSES AND RELATED AREAS)

WRITING ACROSS THE CURRICULUM:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR or SUPPORTING COURSES AND RELATED AREAS)

REQUIREMENTS FOR THE MAJOR: 94 credits
(This includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

COMMON REQUIREMENTS FOR MAJOR (All options)

PRESCRIBED COURSES (20 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-2)
BIOL 110 GN(4) (Sem: 1-4)

REQUIREMENTS FOR THE OPTIONS: 60-88 credits

GENERAL SCIENCE OPTION: (68-79 credits)

ADDITIONAL COURSES (15-20 credits)
Select 4 credits from BIOL 129 GN(4), BIOL 220W(4), BIOL 230W(4), BIOL 240W(4) or BIOL 141 GN(3) and BIOL 142(1) (Sem: 3-4)
Select 3-4 credits from STAT 200 GQ(4), or STAT 250 GQ(3) or STAT 301(3) or STAT 401(3) (Sem: 3-4)
Select 8-12 credits from PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (53-59 credits)
(A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.)
Select 20-26 credits from program list (Students may apply 6 credits of ROTC.) (Sem: 1-8)
Select 3 credits from earth and mineral sciences (Sem: 3-8)
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level (Sem: 3-8)
Select 3 credits in Global, Social and Personal Awareness from department approved course list in consultation with adviser (Sem: 3-8)
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser (Sem: 3-8)
Select 6 credits of 400-level courses (Sem: 5-8)

BIOLOGICAL SCIENCES AND HEALTH PROFESSIONS OPTION: (66-80 credits)

PRESCRIBED COURSES (3 credits)
H P A 101(3) (Sem: 3-6)

ADDITIONAL COURSES (24-31 credits)
Select 4 credits from BIOL 129 GN(4), BIOL 220W(4), BIOL 230W(4), BIOL 240W(4) or BIOL 141 GN(3) and BIOL 142(1) (Sem: 3-4)
Select 3-4 credits from STAT 200 GQ(4), or STAT 250 GQ(3) or STAT 301(3) or STAT 401(3) (Sem: 3-4)
Select 6-8 credits from CHEM 210(3), CHEM 212(3), CHEM 213(2) or CHEM 202(3), CHEM 203(3) (Sem: 3-6)
Select 3 credits from B M B 211(3), B M B 251(3), MICRB 201(3), BIOL 222(3), or BIOL 322(3) (Sem: 3-6)
Select 8-12 credits from PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (39-46 credits)
(A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.)
Select 15 credits from program list for Healthcare/Medicine/Ethical Competencies; 6 credits must be at the 400-level (Sem: 3-8)
Select 9-16 credits from program list (Students may apply 6 credits of ROTC.) (Sem: 1-8)
Select 3 credits in Global, Social and Personal Awareness from department approved course list in consultation with adviser (Sem: 3-8)
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser (Sem: 3-8)
Select 9 credits of 400-level B M B, BIOL, BIOTC, or MICRB courses (Sem: 5-8)

LEGAL STUDIES, GOVERNMENT SERVICE, PUBLIC POLICY OPTION: (68-78 credits)

ADDITIONAL COURSES (15-20 credits)
Select 4 credits from BIOL 129 GN(4), BIOL 220W(4), BIOL 230W(4), BIOL 240W(4) or BIOL 141 GN(3) and BIOL 142(1) (Sem: 3-4)
Select 3-4 credits from STAT 200 GQ(4), or STAT 250 GQ(3) or STAT 301(3) or STAT 401(3) (Sem: 3-4)
Select 8-12 credits from PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (53-58)
Select 11-16 credits from program list (Students may apply 6 credits of ROTC. (Sem: 1-8)
Select 18 credits in life, mathematical, or physical sciences, with at least 9 credits at the 400 level (Sem: 3-8)
Select 18 credits from program list for Legal Studies, Government Service, Public Policy; 6 credits must be at the 400-level (Sem: 3-8).
Select 3 credits in Global, Social and Personal Awareness from department approved course list in consultation with adviser (Sem: 3-8)
Select 3 credits in Teamwork and Interpersonal Communication from department approved course list in consultation with adviser (Sem: 3-8)

**LIFE SCIENCE OPTION:** (60-88 credits)

**ADDITIONAL COURSES** (24-30 credits)
Select 4 credits from BIOL 220W GN(4), BIOL 230W GN(4), BIOL 240W GN(4) (Sem: 3-4)
Select 3 credits from CMPSC 101 QG(3), MATH 250(3), or STAT 250 QG(3) (Sem: 3-4)
Select 3 credits from B M B 211(3), B M B 251(3), or MICRB 201(3) (Sem: 3-4)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-6)
PHYS 211 GN(4)[1], PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4)[1], PHYS 251 GN(4) (Sem: 3-6)

**SUPPORTING COURSES AND RELATED AREAS** (36-58 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
Select 21-36 credits from program list (Students may apply 6 credits of ROTC.) (Sem: 1-8)
Select 0-8 credits in a foreign language (proficiency demonstrated by examination or course work to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits) (Sem: 1-8)
Select 6 credits of 400-level courses (Sem: 5-8)
Select 9 credits[1] of 400-level B M B, BIOL, BIOTC, or MICRB courses (Sem: 5-8)

**MATHEMATICAL SCIENCE OPTION:** (61-88 credits)

**PRESCRIBED COURSES** (5-6 credits)
CMPSC 122(3), MATH 220 QG(2-3) (Sem: 3-6)

**ADDITIONAL COURSES** (24-29 credits)
Select 3 credits from B M B 211(3), B M B 251(3), or MICRB 201(3) (Sem: 3-4)
CMPSC 121 QG(3), CMPSC 201 QG(3), or CMPSC 202 QG(3) (Sem: 3-6)
MATH 230(4) or MATH 251(4) (Sem: 3-6)
CMPSC 360(3) or MATH 311W(3-4); STAT 301 QG(3) or STAT 318(3) (Sem: 3-8)
PHYS 211 GN(4)[1], PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2); or PHYS 250 GN(4)[1], PHYS 251 GN(4) (Sem: 3-8)

**SUPPORTING COURSES AND RELATED AREAS** (32-53 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
Select 17-30 credits from program list (Students may apply 6 credits of ROTC.) (Sem: 1-8)
Select 0-8 credits in a foreign language (proficiency demonstrated by examination or course work to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits) (Sem: 1-8)
Select 9 credits[1] of 400-level CMPSC, CSE, MATH, or STAT courses (Sem: 5-8)
Select 6 credits of 400-level courses (Sem: 5-8)

**PHYSICAL SCIENCE OPTION:** (63-85 credits)

**PRESCRIBED COURSES** (15 credits)
ASTRO 291 GN(3), PHYS 211 GN(4)[1], PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) (Sem: 3-6)

**ADDITIONAL COURSES** (16-19 credits)
Select 3 credits from B M B 211(3), B M B 251(3), or MICRB 201(3) (Sem: 3-4)
CHEM 202(3), CHEM 203(3); or CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 3-6)
MATH 230(4) or MATH 251(4) (Sem: 3-6)
Select 3-4 credits from ASTRO 292 GN(3; E MCH 211(3); M E 300(3); or PHYS 237(3) (Sem: 3-8)

**SUPPORTING COURSES AND RELATED AREAS** (32-51 credits)
A maximum of 12 credits of Independent Study [296, 496] may be applied toward credits for graduation.
Select 17-28 credits from program list (Students may apply 6 credits of ROTC.) (Sem: 1-8)
Select 0-8 credits in a foreign language (proficiency demonstrated by examination or course work to the level of the second semester; if fewer than 8 credits are needed to reach the required proficiency, students choose selections from program list to total 8 credits) (Sem: 1-8)
Select 6 credits of 400-level courses (Sem: 5-8)
Select 9 credits[1] of 400-level ASTRO, CHEM, or PHYS courses (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[60] Physical sciences include ASTRO, CHEM, PHYS; mathematical sciences include CMPSC, MATH, STAT; life sciences include BIOL, BIOTC, B M B, MICRB.

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 39-01-105A
Review Date: 08/24/2010
UCA Revision #1: 9/1/06
UCA Revision #2: 7/730/07

SC

**Sociology**
The major provides graduates with a sociological perspective on human behavior informed by exposure to different substantive areas of the field; an understanding of the structure of American society, its internal diversity, and its international context; an understanding of basic principles of the scientific method, statistics, research design, computer use, logic and critical thinking, and how these apply to the study of human behavior; and experience in posing sociological questions and collecting and analyzing data to bear on those questions. Graduates have the background to seek employment in a variety of public and private sector jobs, to pursue graduate study in sociology or related areas, or to enter professional schools in social work, law, business, or health fields.

Students may choose either a Bachelor of Arts or a Bachelor of Science degree program. The B.A. degree in Sociology is a classic liberal arts degree. The B.S. degree is intended for students with a strong interest in quantitative skills. Students completing the B.S. degree have additional training in mathematics and other social science disciplines.

Opportunities to work as departmental teaching and research assistants are available. Students are encouraged to participate in study abroad and/or internship experiences while enrolled in either the B.A. or B.S. sociology majors.

Graduates of this program have found positions in social research, social service agencies, government and business research and planning offices, other business positions (especially sales and marketing), or have entered graduate school in sociology, social work, policy analysis or law school.

For the B.A. and B.S. degrees in Sociology, a minimum of 123 credits is required. Either degree may be combined with a minor such as Business/Liberal Arts, Human Development and Family Studies, or Information Systems and Statistical Analysis, among others.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 20 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 38 credits[1]
(This includes 4 credits of General Education GQ courses.)

PRESCRIBED COURSES (23 credits)
SOC 001 GS(3), STAT 200 GQ(4), CAS 283(3) (Sem: 1-6)
SOC 207(3) (Sem: 3-6)
SOC 405(3), SOC 470(4) (Sem: 5-8)
SOC 400W(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits in sociology, at least 9 credits at the 400 level (Sem: 1-8)

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-042
Review Date: 01/12/2010
Dept head updated: 11/30/07

LA

Sociology

University Park, College of the Liberal Arts (SOCBS)

PROFESSOR JOHN ICELAND, Head

Students may choose either a Bachelor of Arts or a Bachelor of Science degree program. The B.A. degree program provides a basic orientation to the field as a whole, study of its development and principles, training in methodology and study in depth of a major area of the discipline. It provides knowledge that is useful in a career in varied work settings as well as providing the foundation needed for graduate study in sociology of related fields.
For the B.S. degree in Sociology, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

INTERCULTURAL AND INTERNATIONAL COMPETENCE:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 21-23 credits

REQUIREMENTS FOR THE MAJOR: 61-63 credits
(This includes 6 credits of General Education GQ courses.)

PRESCRIBED COURSES (13 credits)
SOC 001 GS(3), SOC 207(3) (Sem: 1-8)
SOC 405(3), STAT 480(1) (Sem: 5-8)
SOC 400W(3) (Sem: 7-8)

ADDITIONAL COURSES (9-11 credits)
MATH 110 GQ(4), MATH 111 GQ(2); or MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-4)
CAS 283(3) or MATH 441(3) (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS (39 credits)
Select 18 credits in sociology, 15 credits of which must be in an area of specialization chosen in consultation with a faculty adviser (9 credits must be at the 400 level) (Sem: 1-8)
Select 18 credits in social sciences, 9 credits in each of two fields of the social sciences other than sociology (at least 9 credits must be at the 400 level) (Sem: 3-8)
Select 3 credits in statistics at the 300 level or above (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-06-104
Review Date: 04/12/2011
Dept head updated: 12/2/11

Spanish

University Park, College of the Liberal Arts (SPNBA)

PROFESSOR PAOLA (GIULI) DUSSIAS, Head

This major is designed to develop basic skills in speaking, understanding, reading, and writing Spanish. In addition, the program aims to acquaint students with the literature and civilization of the Hispanic world and introduce them to the study of Hispanic linguistics. Enough flexibility is provided to permit a degree of concentration in either Hispanic literature or linguistics. Specialized courses are offered in translation techniques and in the use of Spanish for social services. Courses taken in the University’s Education Abroad Program in Spain and Mexico may be applied to the major. In conjunction with the College of Education, students may take work leading to certification as Spanish teachers in the secondary or elementary schools.

Combined with course work in business, social welfare, or bilingual education, the B.A. in Spanish can facilitate entry into a number of professional areas. In addition, it provides the traditional foundation for advanced degree work required for such careers as college teaching and government service. Students are eligible to participate in the University’s Education Abroad Programs.

For the B.A. degree in Spanish, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selections)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or BACHELOR OF ARTS DEGREE REQUIREMENTS course selections)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES:
18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits [1]

PRESCRIBED COURSES (9 credits)
SPAN 200(3) (Sem: 2-6)
SPAN 215(3) (Sem: 3-6)
SPAN 253W(3) (Sem: 3-8)

ADDITIONAL COURSES (18 credits)
SPAN 100(3) or SPAN 100A(3)* (Sem: 2-6)
Select 9 credits from the following course list: SPAN 210(3), SPAN 220(3), SPAN 297(3), SPAN 300(3), SPAN 305(3), SPAN 353(3), SPAN 354(3), SPAN 355(3), SPAN 356(3), SPAN 397(3), SPAN 399 IL(3) (Sem: 3-8)
Select 3 credits from the following: SPAN 439(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9) (Sem: 5-8)
Select 3 credits from the following: SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 497(1-9) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits from the following course list: SPAN 410(3), SPAN 412(3), SPAN 413(3), SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(3), SPAN 499 IL(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

* Heritage speakers (students with Spanish language in family background but not necessarily a native speaker) should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 110.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-06-147
Review Date: 04/10/2012

LA

Spanish

University Park, College of the Liberal Arts (SPNBS)
PROFESSOR PAOLA (GIULI) DUSSIAS, Head

This major encourages students to prepare for careers in which fluency in Spanish can be combined with training in other academic disciplines.

For the B.S. degree in Spanish, a minimum of 122 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(0-9 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 17-19 credits

REQUIREMENTS FOR THE MAJOR: 60-71 credits [1]
(This includes 0-13 credits of General Education courses: 0-4 credits of GQ courses; 0-6 credits of GS courses, 0-3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 21 credits

PRESCRIBED COURSES (6 credits)
SPAN 215(3), SPAN 253W(3) (Sem: 2-8)

ADDITIONAL COURSES (15 credits)
SPAN 100(3) or SPAN 100A(3)* (Sem: 2-6)
SPAN 200(3) or SPAN 301(3)* (Sem: 2-6)
Select 9 credits from SPAN 210(3), SPAN 220(3); SPAN 300(3), SPAN 305(3), SPAN 353(3), SPAN 354(3), SPAN 355(3), SPAN 356(3), SPAN 399 IL(1-12) (Sem: 1-8)

REQUIREMENTS FOR THE OPTION: 39-50 credits

APPLIED SPANISH OPTION: (39 credits)
This option is designed to develop basic skills in Spanish (speaking, understanding, reading, writing) and to provide Spanish majors with concentration in a professional area where a command of Spanish can be particularly relevant and useful. Students are eligible to participate in the University's Education Abroad Programs.

ADDITIONAL COURSES (18 credits)
Select 3 credits from the following: SPAN 439(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9) (Sem: 5-8)
Select 3 credits from the following: SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 497(1-9) (Sem: 5-8)
Select 12 credits from SPAN 410(3), SPAN 412(3), SPAN 413(3), SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 440(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9), SPAN 499 IL(1-12) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 21 credits in consultation with the adviser in any related area of study such as social services, the teaching of English as a second language, or in any other professional area in which competency in Spanish is desirable. At least 6 credits of such courses must be at the 400 level. (Sem: 1-8)

BUSINESS OPTION: (50 credits)
This option is designed to develop basic skills in Spanish (speaking, understanding, reading, writing) and to acquaint students with a number of fields essential to business, especially in the international area. Courses in translation techniques, Spanish civilization, and Ibero-American civilization are an integral part of the option. Students are eligible to participate in the University's Education Abroad Programs.

PRESCRIBED COURSES (34 credits)
ACCTG 211(4), ECON 102 GS(3), ECON 104 GS(3), ECON 333 GS(3), ENGL 202D GWS(3), FIN 100(3), I B 303 IL(3), I B 403(3), MGMT 100W(3); MKTG 221(3), SPAN 420(3) (Sem: 1-8)

ADDITIONAL COURSES (16 credits)
Select 4 credits from SCM 200 GQ(4) or STAT 200 GQ(4) (Sem: 1-8)
Select 12 credits from SPAN 410(3), SPAN 412(3), SPAN 413(3), SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 439(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9), SPAN 499 IL(1-12) (Sem: 5-8)

* Heritage speakers (students with Spanish language in family background) and native speakers of Spanish should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 200. May not take SPAN 410.

Integrated Spanish B.S. and Human Resources and Employment Relations M.S. Degree Programs (SPHRER)

PROFESSOR MARK WARDELL, in charge
The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University’s Education Abroad Program, if they choose to have that experience. Students also will learn about (1) the roles of employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B. S./M. S. degree in Integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required. Twelve graduate level credits can apply to both undergraduate and graduate degrees; six of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. HRER degree if they desire.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

BACHELOR OF SCIENCE

GENERAL EDUCATION: 45 credits
(10 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin).

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

REQUIREMENTS FOR THE MAJOR: 101 credits
(This includes 10 credits of General Education courses: 6 credits of GS courses; 4 credits of GQ courses.)

PRESCRIBED COURSES (27 credits)
[Some courses in this category have prerequisites that are not included in the major]
SPAN 100(3), SPAN 120(3), SPAN 200(3), SPAN 253W(3), SPAN 305(3) (Sem: 1-6)
SPAN 400(3), SPAN 410(3), SPAN 412(3), SPAN 414(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
SPAN 210(3) or SPAN 220(3), SPAN 353(3) or SPAN 354(3) (Sem: 3-6)
SPAN 472(3) or SPAN 476(3) (Sem: 5-8)
Select 3 credits of SPAN 413(3), SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 490(3), SPAN 491(3), or SPAN 497(1-9) (Sem: 5-8)

LABOR AND EMPLOYMENT RELATIONS: (32 credits)
[Prescribed undergraduate credits in Labor and Employment Relations option]
ECON 102 GS(3), LER 100 GS(3), LER 201(3), LER 312(4), LER 400 IL(3), LER 414W(3), LER 458Y US(3), STAT 200 GQ(4) (Sem: 1–6)
HRER 501(3), HRER 512(3) (Sem: 7–8)

Master of Science

EMPLOYMENT RELATIONS/HUMAN RESOURCES M.S.: (30 credits)
[HRER credits to be selected from the following in consultation with an HRER adviser]
HRER 500, HRER 502, HRER 504, HRER 505, HRER 513, HRER 516, HRER 517, HRER 535, HRER 536, HRER 595*, HRER 596*, HRER 597, HRER 599

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

* Heritage speakers (students with Spanish language in family background but not necessarily a native speaker) should take SPAN 100A and SPAN 301W instead of SPAN 100 and SPAN 300W.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-06-148 (SPNBS); 35-06-466 (Integrated)
Review Date: 04/10/2012

Comments
LA

Special Education

University Park, College of Education (SPLED)

PROFESSOR KATHLEEN McKINNON, Coordinator of Teacher Education in Special Education

The emphasis throughout the Special Education program is upon a broad clinical teaching model. Course work and practicum experiences focus upon the diagnosis and management of a wide range and degree of educational and behavioral problems of students with disabilities between the ages of 3 and 21. A core of Special Education courses aimed at general skill development in the areas of diagnosis, prescription, development of materials and teaching strategies, implementation, and evaluation is required of all students.

This major focuses on teaching principles and methodologies, classroom and behavioral management, and the development of teaching materials for children and youths with mild, moderate, and severe disabilities. This program helps prepare special education teachers to meet the needs of students enrolled in elementary and secondary public school special education programs.

Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:
1. A minimum cumulative grade point average of 3.00
2. Satisfaction of any basic-skills or entrance testing requirements as specified by the Pennsylvania Department of Education in force at the time of application for entrance to the major.
3. Documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. Candidates for Special Education must document two separate 40-hour experiences in two different settings, with learners who have special needs. One experience should include learners with a different level of severity or functioning (e.g., mild/severe, young/adult) from those learners in the other experience. One experience should also include learners with cultural, social, or ethnic backgrounds different from the candidates own.

Requirements 4-9 must be met by the end of the fourth semester when students typically participate in the Entrance to Major process.

4. A grade of “C” or better in all specified courses.
5. Completion of an early field experience specified by the certification program.
6. Completion of a core of Education courses specified by the certification program.
7. Completion of additional credits as specified by the certification program.
8. Completion of at least 48 semester credit hours, including ENGL 015 GWS(3) or ENGL 030 GWS(3), three credits of literature, and six credits of quantification.
9. Approval from the professional education adviser or the head of the pertinent certification program.

For the B.S. degree in Special Education, 122 credits are required. (See also Teacher Education Programs.)

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(12-15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)
FIRST-YEAR SEMINAR:  
(Included in ELECTIVES or GENERAL EDUCATION course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in ELECTIVES or GENERAL EDUCATION course selections)

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 3 credits [19]

REQUIREMENTS FOR THE MAJOR: 86 credits [21]  
(This includes 12 credits of General Education courses: 6 credits of GQ courses; 6 credits of GS courses.)

PRESCRIBED COURSES (86 credits)  
EDPSY 010 GS(3), EDPSY 014(3), EDPSY 101 GQ(3), EDTHP 115 US(3), MATH 200 GQ(3), PSYCH 100 GS(3), PSYCH 212 GS(3) (Sem: 1-4)  
Red Cross Certification in First Aid and CPR(0) (Sem: 1-8)  
SPLED 409A(3), SPLED 409B(3), SPLED 409C(3), SPLED 418(3), SPLED 495(15), SPLED 495G(4) (Sem: 7-8)

Integrated B.S. in Special Education - M.Ed. in Curriculum and Instruction

The Special Education and Curriculum and Instruction with Emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LL ED IUG) Degree Program consists of integration of required courses for a B.S. in Special Education with courses required for certification as a Reading Specialist and a M.Ed. in Curriculum and Instruction with emphasis in Language and Literacy Education. The five-year, SE/CI-LL ED IUG is an option for highly qualified students seeking certification to teach Special Education in Pennsylvania in grades K-12. Completion of the IUG (along with earning a passing score on PDE required PRAXIS tests) leads to a B.S. in Special Education, certification in Special Education and as a Reading Specialist in the state of Pennsylvania, and a M.Ed. in Curriculum and Instruction. Students are expected to complete courses required for the graduate level K-12 reading specialist concurrent with their undergraduate experiences and coursework in Special Education and will complete a capstone Special Education teaching experience in their final semester.

Time of Admission to SE/CI-LL ED IUG

Students wishing to apply for admission to the SE/CI-LL ED IUG initiate application during the semester in which they complete SPLED 495E. They finalize the application process at the end of the semester with a grade of B or better in SPLED 412. While this is typically the end of the junior year of study, it may fall sooner or later.

Joint Admission Process

Special Education and Curriculum and Instruction are located in the College of Education, with Reading Specialist certification offered through the Department of Curriculum and Instruction’s emphasis area in Language and Literacy Education. Admission to the SE/CI-LL ED IUG will be based upon having attained a minimum GPA of 3.5 or higher, with a grade of B or better in SPLED 412.

Admission will be based on a recommendation by the Reading Specialist Program Coordinator in consultation with the Coordinator of Teacher Education in Special Education.

Students will be expected to maintain a minimum GPA of 3.0 throughout the IUG program of study. Failure to do so will result in the student being placed on academic probation for one semester; after which time, if the GPA is not 3.0 or higher, the student will be dropped from the IUG.

If the student decides not to continue enrollment in the joint SE/CI-LL ED IUG, the student may, contingent upon fulfilling all other requirements for the B.S. in SPLED, complete SPLED 495 (the traditional capstone field experience) in their final semester and graduate with a B.S. in Special Education.

Advising

Beginning during the application process, as well as subsequent to admission, students should communicate with both their SPLED program adviser and the program adviser for the CI Reading Specialist program to ensure requirements of both programs are met.

Reduced Course Load

EDPSY 421 and LL ED 595A may be double counted for the M.Ed. as well as the B.S. degree.

Tuition Charges

Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring payment of graduate tuition (from “Information and Guidelines for Establishing Integrated Undergraduate-Graduate Degree Programs” - approved by the Graduate Council, May 8, 1996).

[19] Students may apply 3 credits of ROTC.  
[21] A grade of C or better per course is required for all Special Education prerequisites and teacher certification.

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-05-032  
Review Date: 2/24/2015  
R & T: 01/14/2014
Statistics

University Park, Eberly College of Science (STAT)

PROFESSOR DAVID HUNTER, Head, Department of Statistics

This major helps prepare students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts, or for further graduate training in statistics. The major includes five options: An Actuarial Statistics Option for students interested in working as actuaries in the insurance or business fields; an Applied Statistics Option for students interested in a cross-disciplinary program, such as econometrics, or psychometrics; a Biostatistics Option for students interested in pursuing careers with pharmaceutical companies, research hospitals or other fields in which biological data is analyzed; a Graduate Study Option for students planning to go to graduate school in a statistics-related field; and a Statistics and Computing Option for students wishing to combine statistical expertise with programming skills.

In order to be eligible for entrance into the Statistics major, a student must have: 1) Attained at least a 2.00 cumulative grade point average. 2) Completed MATH 140 GQ(4) and MATH 141 GQ(4); and earned a grade of C or better in each of these courses.

For the B.S. degree in Statistics a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(6-15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in GENERAL EDUCATION course selection or REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 80-95 credits
(This includes 6-15 credits of General Education: 0-9 credits of GN courses; 6 credits of GQ courses, 0-6 credits of GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 34 credits

PRESCRIBED COURSES (34 credits)
MATH 140 GQ(4)[1], MATH 141 GQ(4)[1] (Sem: 1-2)
MATH 220 GQ(2-3)[1], MATH 230(4)[1], STAT 200(4)[1] (Sem: 3-4)
STAT 414(3)[1], STAT 415(3)[1], STAT 461(3)[1], STAT 462(3)[1], STAT 470W(3)[1], STAT 480(1)[1] (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 47-57 credits

ACTUARIAL STATISTICS OPTION: 53 credits

Students who major in statistics with the actuarial statistics option and who wish to complete a concurrent major in mathematics may not choose the actuarial mathematics option in mathematics. Any other option in mathematics is acceptable.

PRESCRIBED COURSES (28 credits)
ECON 102 GS(3), ECON 104 GS(3) (Sem: 1-4)
ACCTG 211(4)[1] (Sem: 3-4)
FIN 301(3)[1], R M 302(3)[1], R M 410(3)[1], R M 411(3)[1], R M 412(3)[1], STAT 463(3)[1] (Sem: 4-8)

ADDITIONAL COURSES (12 credits)
Select 3 credits from: CMPSC 101 GQ(3)[1], CMPSC 102(3)[1], CMPSC 121 GQ(3)[1], CMPSC 200 GQ(3)[1], CMPSC 201 GQ(3)[1], or CMPSC 202 GQ(3)[1] (Sem: 1-4)
Select 9 credits from I E 434(3)[1], I E 436(3)[1], MATH 436(3)[1] or MATH 441(3)[1], MATH 451(3)[1] or MATH 455(3)[1], STAT 416(3)[1], STAT 440(3)[1], STAT 463(3)[1], STAT 464(3)[1], STAT 466(3)[1] (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (32 credits)
Select 13 credits from department list (Sem: 1-8)

APPLIED STATISTICS OPTION: (47 credits)

ADDITIONAL COURSES (15 credits)
Select 3 credits from: CMPSC 101 GQ(3)[1], CMPSC 121 GQ(3)[1], CMPSC 201 GQ(3)[1], or CMPSC 202 GQ(3)[1] (Sem: 1-4)
Select 12 credits from I E 434(3)[1], I E 436(3)[1], MATH 436(3)[1] or MATH 441(3)[1], MATH 451(3)[1] or MATH 455(3)[1], STAT 416(3)[1], STAT 440(3)[1], STAT 463(3)[1], STAT 464(3)[1], STAT 466(3)[1] (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (32 credits)
Select 32 credits from department list, including a minor in a supporting field other than Mathematics. (Sem: 1-8)
(Neither the mathematics major nor the six sigma minor, nor the risk management major with the actuarial science option may be used to satisfy the minor/concurrent major requirement. If a student wants to work in a supporting field that does not have a minor, he or she can propose a list of six appropriate courses and petition the Statistics Department for approval. It is the student's responsibility to justify the appropriateness of the proposed list. Students must receive a grade of C or better in each of these six courses.)

**BIOSTATISTICS OPTION:** (56-57 credits)

**PRESCRIBED COURSES** (8 credits)
BIOI 110 GN(4)[1], CHEM 110 GN(3)[1], CHEM 111 GN(1)[1] (Sem: 1-3)

**ADDITIONAL COURSES** (28-29 credits)
Select 3 credits from: CMPSC 101 GQ(3)[1], CMPSC 121 GQ(3)[1], CMPSC 201 GQ(3)[1], or CMPSC 202 GQ(3)[1] (Sem: 1-4)
Select 7-8 credits from BIOL 220W GN(4)[1], BIOL 222(3)[1], BIOL 230W GN(4)[1], BIOL 240W GN(4)[1] (Sem: 5-8)
Select 6 credits from 400-level BIOL courses[1] (Sem: 5-8)
Select 12 credits from: I E 434(3)[1], I E 436(3)[1], MATH 436(3)[1] or MATH 441(3)[1], MATH 451(3)[1] or MATH 455(3)[1], STAT 416(3)[1], STAT 440(3)[1], STAT 463(3)[1], STAT 466(3)[1], STAT 466(3)[1] (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (19-20 credits)
Select 19-20 credits from department list (Sem: 1-8)

**GRADUATE STUDY OPTION:** (47 credits)
A student completing the Graduate Study option will have earned a minor in mathematics in addition to a B.S. in Statistics. However, a student must fill out and submit the appropriate paperwork to the Mathematics Department in order for this minor to be officially recognized.

**PRESCRIBED COURSES** (9 credits)
MATH 312(3)[1], MATH 403(3)[1], MATH 404(3)[1] (Sem: 5-8)

**ADDITIONAL COURSES** (24 credits)
Select 3 credits from: CMPSC 101 GQ(3)[1], CMPSC 121 GQ(3)[1], CMPSC 201 GQ(3)[1], or CMPSC 202 GQ(3)[1] (Sem: 1-4)
Select 9 credits from MATH 310(3)[1], MATH 311W(3-4)[1], MATH 421(3), MATH 422(3)[1], MATH 426(3), MATH 429(3), MATH 456(3)[1], MATH 468(3)[1], MATH 469(3)[1] (Sem: 5-8)
Select 12 credits from: I E 434(3)[1], I E 436(3)[1], MATH 436(3)[1] or MATH 441(3)[1], MATH 451(3)[1] or MATH 455(3)[1], STAT 416(3)[1], STAT 440(3)[1], STAT 463(3)[1], STAT 466(3)[1], STAT 466(3)[1] (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (14 credits)
Select 14 credits from department list (Sem: 1-8)

**STATISTICS AND COMPUTING OPTION:** (47 credits)

**PRESCRIBED COURSES** (9 credits)
CMPSC 121 GQ(3)[1], CMPSC 122(3)[1], CMPSC 465(3)[1] (Sem: 1-6)

**ADDITIONAL COURSES** (24 credits)
Select 3 credits from: CMPSC 360(3)[1] or MATH 311W(3-4)[1] (Sem: 3-6)
Select 9 credits from CMPSC 221(3)[1], 400-level CMPSC[1] other than CMPSC/MATH 451 or CMPSC/MATH 455 (Sem: 5-8)
Select 12 credits from: I E 434(3)[1], I E 436(3)[1], MATH 436(3)[1] or MATH 441(3)[1], MATH 451(3)[1] or MATH 455(3)[1], STAT 416(3)[1], STAT 440(3)[1], STAT 463(3)[1], STAT 466(3)[1], STAT 466(3)[1] (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (14 credits)
Select 14 credits from department list (Sem: 1-8)

**Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)**
The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master's degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analyst. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

**Application Process**
The number of openings in the integrated B.S./M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Statistics B.S. program.

1. Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415, and the students must apply to the program prior to completing 110 credits.

1. Must submit a transcript and a statement of purpose.
1. Must present a departmental-approved plan of study in the application process in consultation with the M.A.S. program director.

1. Must be recommended by the chair of the department’s undergraduate program committee.

1. Must be accepted into the M.A.S. program in Statistics.

For the IUG B.S./M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate-level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

- STAT 414 (3) Introduction to Probability Theory
- STAT 415 (3) Introduction to Mathematical Statistics
- STAT 501 (3) Regression Methods
- STAT 502 (3) Analysis of Variance and Design of Experiments

Assuming all requirements for the B.S. are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. Degree if they desire.

Degree Requirements

IUG Statistics B.S. prescribed Statistics courses: See above, but note that students in IUG Statistics B.S. take STAT 501 and 502 instead of STAT 460 and 462.

IUG Statistics M.A.S. requirement (30 credits)

- STAT 414 (3) Introduction to Probability Theory
- STAT 415 (3) Introduction to Mathematical Statistics
- STAT 501 (3) Regression Methods
- STAT 502 (3) Analysis of Variance and Design of Experiments
- STAT 580 (2) Statistical Consulting Practicum I
- STAT 581** (1) Statistical Consulting Practicum II
- Electives (15) Choose from STAT 503-510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

**For all students in the M.A.S. program, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2012 (STAT); Summer Session 2003 (Integrated B.S./M.A.S.)
Blue Sheet Item #: 40-06-237A (STAT); 31-01-123 (Integrated B.S./M.A.S.)
Review Date: 04/10/2012
UCA Revision #1: 9/1/06
UCA Revision #2: 7/30/07
SC

Supply Chain and Information Systems

University Park, Smeal College of Business (SC&IS)

PROFESSOR JOHN E. TYWORTH, Chair of the Department of Supply Chain and Information Systems

The SC&IS major concentrates on the management of value-creating supply chain networks that modern business enterprises use to acquire, produce, and deliver goods and services all over the world and on information technology as the key enabler of supply chain integration. Students learn how to analyze and design supply chains and manage core business processes including (1) sourcing and procuring raw materials, (2) manufacturing and service operations, and (3) planning and fulfilling customer demand. Students also develop knowledge, skills, and abilities in the information systems area, including information processing, databases, information systems design and analysis, and supply chain technologies.

Graduates are well-prepared for careers in the supply chain and information systems area in both industry and government, including manufacturing, service, technology, and merchandising companies, third-party logistics providers, transport system enterprises, consulting firms, and government agencies.

More information about the broad range of career opportunities is available at http://www.smeal.psu.edu/scis/recruit.

Entrance Requirement: To be eligible for entrance into the Supply Chain and Information Systems (SC&IS) major, a degree candidate must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies and satisfy
Specific entrance requirements include:

1. The degree candidate must be taking, or have taken, a program appropriate for entry to the major as shown in the bulletin, including approximately 60 credits of course work.

2. Complete the following entrance to major requirements: ACCTG 211(4) [1]; ECON 102 GS(3); SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1]; ENGL 015 GWS(3) or ENGL 030 GWS(3); and MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1]; FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1]. These courses must be completed by the end of the semester during which the entrance to major process is carried out.

3. In addition to the above requirements, the Executive Vice President and Provost of the University may approve administrative enrollment controls that limit the number of students who are admitted to majors in the Smeal College of Business. In each case, however, academic requirements are established for admission. For information on enrollment controls, consult the Smeal College of Business Web site [http://www.smeal.psu.edu](http://www.smeal.psu.edu).

For the B.S. degree in Supply Chain and Information Systems, a minimum of 120 credits is required (at least 15 credits must be taken at the 400 level).

**GENERAL EDUCATION:** 45 credits

(12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in ELECTIVES or GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 14 credits

**REQUIREMENTS FOR THE MAJOR:** 73 credits

(This includes 12 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 3 credits of GS courses.)

**PRESCRIBED COURSES** (52 credits)

ACCTG 211(4)[1], ECON 102 GS(3), FIN 301(3)[1]; MGMT 301(3)[1]; and MKTG 301(3)[1] (Sem: 1-4)

MIS 204(3), SCM 301(3)[1] (Sem: 3-5)

B A 342(3), B A 411(3), B LAW 341(3), ECON 104 GS(3), ENGL 202D GWS(3), SCM 404(3)[1], SCM 405(3)[1], SCM 406(3)[1], SCM 421(3)[1], SCM 450W(3)[1] (Sem: 5-8)

**ADDITIONAL COURSES** (8 credits)

MATH 110 GQ(4)[1] or MATH 140 GQ(4)[1] (Sem: 1-2)

SCM 200 GQ(4)[1] or STAT 200 GQ(4)[1] (Sem: 1-2)

**SUPPORTING COURSES AND RELATED AREAS** (13 credits)

Select 4 credits: Attainment of 12th-credit-level proficiency in a single foreign language. (4 credits) Proficiency must be demonstrated by either examination or coursework (Sem: 1-4)

Select 3 credits of related coursework. See department list. (Sem: 5-8)

Select 6 credits of supporting coursework. See department list. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-046

Review Date: 04/13/2010

UCA Revision #1: 8/14/06

**Telecommunications**

*University Park, College of Communications (TELCM)*

**PROFESSOR MATTHEW JACKSON, Head, Department of Telecommunications**

The Telecommunications program seeks to prepare informed, responsible professionals for leadership roles in the electronic communication and information industries. The program stresses the social, cultural and economic impact of electronic media, including radio, television, videogames, telephones and the Internet.

Students can choose an emphasis in programming and production, management and entrepreneurship, law and policy.

Graduates go on to careers at local radio and television stations; broadcast, cable and satellite networks; Internet content and service providers; wired and wireless telephone companies; and other related media and entertainment industries. The major emphasizes the business and legal parameters of telecommunications, making it an excellent preparation for law school or graduate school and careers in government policy and the entertainment field.

Students must select at least 80 credits in courses outside the College of Communications, including at least 65 in the liberal arts and sciences.
For the B.A. degree in Telecommunications, a minimum of 120 credits is required.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**GENERAL EDUCATION:** 45 credits
(3-4 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in ELECTIVES)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**ELECTIVES:** 19 - 20 credits

**BACHELOR OF ARTS DEGREE REQUIREMENTS:** 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 34-35 credits
(This includes 3-4 credits of General Education GS courses.)

**PRESCRIBED COURSES** (10 credits)
COMM 160(1) (Sem: 1-4)
COMM 180 GS(3) (Sem: 3-4)
COMM 280(3), COMM 380(3) (Sem: 5-6)

**ADDITIONAL COURSES** (21-22 credits)
Select 3-4 credits from: ECON 102 GS(3), ECON 014 GS(3), SCM 200 GQ(4), STAT 200 GQ(4) (Sem: 3-4)
Students must meet with a faculty advisor to approve their course selections from the following areas:
Take 3 credits in law: COMM 403(3), COMM 404(3), or COMM 492(3)
Take 3 credits in capstone courses: COMM 486W(3), COMM 487W(3), or COMM 489W(3)

**SUPPORTING COURSES AND RELATED AREAS** (3 credits)

**Students must take at least 9 credits of 400-level courses from the additional or supporting course lists.**

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

CM

Publications: 2/16/05

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**Theatre**

*Berks College (THABL)*
*University Park, College of Arts and Architecture (THRBA)*

**PROFESSOR RADHICA GANAPATHY, Penn State Berks**
**PROFESSOR ANNETTE McGREGOR, Penn State University Park**

This program offers the theatre student a general background in the various facets of theatre. A broad liberal education is provided and complemented with advanced courses to best serve student interests, talents, and career objectives. Though a strong emphasis is given to the areas of production and performance, majors may also wish to emphasize an area of special interest such as literature, design, dance, playwriting, directing or acting. All B.A. students spend a semester in study abroad at the Theatre Academy of London (TAL), a program that balances academic courses with advanced studio work.

Students who pursue the B.A. in Theatre learn to research, analyze and synthesize information. Majors develop strong oral and written skills and many go on to postgraduate study not only in theatre but also in areas such as law, business and education.

The B.A. in Theatre degree program includes a Theatre Studies Option and three additional options, Theatre Performance, Dance Performance and Multicultural Performance. Entrance criteria to this major will include an interview with members
of the Theatre faculty. Entrance to the three performance options will also include an audition or portfolio review. All four options are available at University Park; the Theatre Studies and Theatre Performance options only are available at Penn State Berks.

For the B.A. degree in Theatre, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(1.5-7.5 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 10-11 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 44.5-51.5 credits[1]
(This includes 1.5-7.5 credits in General Education courses: 1.5 credits GHA courses; 0-6 credits of GH courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 29.5-30.5 credits

PRESCRIBED COURSES (6.5 credits)
DANCE 170 GHA(1.5), THEA 289(1) (Sem: 1-2)
THEA 001S(1) (Sem: 1-4)
THEA 401Y IL(3) (Sem: 3-6)

ADDITIONAL COURSES (11-12 credits)
Select 3 credits from THEA 102 GA(3) or THEA 120(3) (Sem: 1)
Select 2-3 credits from THEA 107 GA(3) or THEA 200(2) (Sem: 1-2)
Select 3 credits from THEA 100 GA:US;IL(3) or THEA 105 GA(3) (Sem: 1-2)
Select 3 credits from THEA 130(3) or THEA 131(3) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits THEA 499 or DANCE 499 (Sem: 6-8)

REQUIREMENTS FOR THE OPTION: 15-21 credits

THEATRE STUDIES OPTION: (15 credits) [1]

PRESCRIBED COURSES (9 credits) [1]
THEA 150(3) (Sem: 1-4)
THEA 402(3), THEA 434(3) (Sem: 5-8)

ADDITIONAL COURSES (6 credits) [1]
Select 6 credits from THEA 405 US(3), THEA 407 US(3), THEA 408 US(3), THEA 412 US;IL(3), or THEA 464(3) (Sem: 5-8)

THEATRE PERFORMANCE OPTION: (21 credits) [1]

PRESCRIBED COURSES (9 credits)
THEA 150(3) (Sem: 1-2)
THEA 402(3), THEA 434(3) (Sem: 3-6)

ADDITIONAL COURSES (12 credits):
Select 3 credits from THEA 121(3) or THEA 289(3) (Sem: 1-4)
Select 6 credits (with permission of adviser/instructor) from:
THEA 220(3), THEA 221(3), THEA 322(2), THEA 324(2) (Sem: 3-8)
OR
THEA 410(3), THEA 436(3), THEA 437(1-6) (Sem: 5-8)
OR
THEA 440(3-6) (Sem: 5-8)
OR
THEA 250(3), THEA 251(2), THEA 252(1), THEA 260(3), THEA 270(3), THEA 350(3) (Sem: 3-8)

DANCE PERFORMANCE OPTION: (18 credits)

PRESCRIBED COURSES (3 credits) [1]
DANCE 410 US;IL(3) (Sem: 5-6)

ADDITIONAL COURSES (15 credits) [1]
Select 9 credits from DANCE 361(1.5), DANCE 362(1.5), DANCE 461(1.5), DANCE 462(1.5) (Sem: 1-7)
Select 6 credits from THEA 146(2), THEA 402(3), THEA 405(3), THEA 407(3), THEA 408(3), THEA 412(3), THEA 440(3), DANCE 411(3) (Sem: 2-8)

MULTICULTURAL PERFORMANCE OPTION (21 credits)
PRESCRIBED COURSES (9 credits) [1]
DANCE 411 GH(3), THEA 412 US;IL(3), THEA 495(3) (Sem: 4-8)

ADDITIONAL COURSES (9 credits)
Select 3 credits from CMLIT 010 GH;IL(3), CMLIT 012 GH;IL(3), CMLIT 101 GH;US;IL(3) (Sem: 3-6)
Select 6 credits from CAS 271 US;IL(3), CMLIT 013 GH;IL(3) CMLIT 140 GH;IL(3), CMLIT 189 GH;IL(3), CMLIT 422 IL(3),
CMLIT 435 IL(3), CMLIT 438 IL(3), CMLIT 453 IL(3), CMLIT 455 IL(3), CMLIT 486 IL(3), CMLIT 487 IL(3), CMLIT 488 IL(3),
CMLIT 491 IL(3), DANCE 221(1.5), DANCE 320(1.5), ENGL 135 GH;US(3), ENGL 226 GH;US;IL(3), ENGL 235 US(3), ENGL 245
GH;US(3), ENGL 426 US(3), ENGL 431 US(3), INART 005 GA(3), INART 062 GA;US;IL(3), MUSIC 007 GA;US(3), MUSIC 009(3)
(Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits in consultation with adviser (Sem 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2013

Blue Sheet Item #: 42-04-001

Review Date: 01/14/2014

AA

Theatre

University Park, College of Arts and Architecture (THRFA)

PROFESSOR WILLIAM KENYON, B.F.A. Program Coordinator, Design and Technology Option
PROFESSOR TRAVIS DeCASTRO, B.F.A. Program Coordinator, Stage Management Option

Not all options are available at every campus. Contact the campus you are interested in attending to determine which
options are offered.

The Bachelor of Fine Arts in Theatre offers two options: Design and Technology, and Stage Management.

The B.F.A. degree in Theatre with the Design and Technology option is intended to develop a level of competence that will
enable students who wish to pursue professional careers in theatre design, theatre technology and related entertainment
fields to prepare themselves for specialized graduate studies, specialized professional training and/or immediate
participation in creative work. The prescribed core curriculum introduces students to each of the theatre design areas and
provides them with a basic skill level in technology. The curriculum also features acting, directing, script analysis, theatre
history and criticism. Students choose an emphasis area after their third semester to focus their awareness, their
capabilities and their critical faculties or abilities in their area of interest.

For the B.F.A. degree in Theatre with the Stage Management option is intended to provide students with specialized
training leading to a high level of competence in the stage management field. Graduates should be able to begin
professional work or pursue further training at the graduate level. The Stage Management option is intended to educate
students for a career in stage management for theatre.

Acceptance into the Design and Technology option is based on a faculty interview and portfolio review. Acceptance into
the Stage Management option is based on a faculty interview and production book review. Both options require a
minimum of 120 credits.

GENERAL EDUCATION: 45 credits
(0-6 credits included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 3-11 credits

REQUIREMENTS FOR THE MAJOR: 70-78 credits
(This includes 0-6 credits of General Education courses: Sound Design emphasis--3 credits of GN courses and 3 credits of
GA courses. Scene Design emphasis--3 credits of GA courses)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 42 credits

PRESCRIBED COURSES (42 credits) [1]
THEA 100 GA;US;IL(3), THEA 001S(1), THEA 120(3), THEA 130(3), THEA 131(3), THEA 150(3), THEA 200(2) (Sem: 1-2)
THEA 250(3), THEA 251(2), THEA 260(3), THEA 270(3), THEA 280(3), THEA 285(3), THEA 289(1) (Sem: 3-6)
THEA 401Y(3), THEA 481(3) (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 28-36 credits

DESIGN AND TECHNOLOGY OPTION: (33-36 credits)

PRESCRIBED COURSES (9 credits) [1]
THEA 252(1) (Sem: 3-6)
THEA 434(3), THEA 454(3), THEA 459(2) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)[1]
Select 6 credits from THEA 456(1), THEA 457(1), THEA 466(1), THEA 467(1), THEA 477(1), THEA 487(1), THEA 489(1) (Sem: 3-8)
Select 3 credits from THEA 464(3) or THEA 465(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (15-18 credits)[1]
Select 15-18 credits from one of the following emphases a, b, c, d, or e
a. Costume Design/Technology: THEA 146(2), THEA 253(1), THEA 261(3), THEA 460(3-6), THEA 461(3-6), THEA 464(3), or THEA 465(3) (Sem: 3-8)
b. Scene Design: THEA 253(1), THEA 450(6), THEA 453(2) (Sem: 3-8)
Select 3 credits from: THEA 460(3), THEA 470(3), THEA 480(3) (Sem: 6-8)
Select 3 credits from: ART H 111 GA(3), ART H 112 GA(3), THEA 451(1), THEA 460(3), THEA 470(3), THEA 480(3), THEA 485(3-6) (Sem: 3-8)
c. Lighting Design: THEA 253(1), THEA 482(3), THEA 485(3-6), THEA 470(6), THEA 472(2) (Sem: 3-8)
d. Sound Design: INART 050 GN(3), INART 258A GA(3), THEA 482(3), THEA 484(3), THEA 485(3-6) (Sem: 3-8)
e. Scenic Technology: THEA 253(1), THEA 482(3), THEA 470(3), THEA 480(6), THEA 485(3-6) (Sem: 3-8)

STAGE MANAGEMENT OPTION: (28 credits)

PRESCRIBED COURSES (25 credits)[1]
THEA 146(2) (Sem: 1-2)
THEA 220(3), THEA 289(1), THEA 322(2), THEA 324(2) (Sem: 3-4)
THEA 486(9) (Sem: 5-8)
THEA 496(6) (Sem: 6-8)

ADDITIONAL COURSES (3 credits)[1]

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[5] Students may apply 6 credits of ROTC.

Toxicology

University Park, College of Agricultural Sciences (TOX)

PROFESSOR JOHN VANDEN HEUVEL, Program Coordinator

Toxicology addresses adverse effects of chemicals on animals and humans and includes exposure assessment, hazard identification, dose-response analysis, and risk characterization. This discipline relies on cutting-edge biotechnological approaches to gain insight into drug and toxicant action at the molecular level. Students enrolled in the Toxicology program will develop an understanding of the principles by which chemicals affect the health of humans and animals either adversely, as toxic agents, or beneficially, as therapeutic agents. Students will learn about: 1) mechanisms of action of drugs and toxicants on organ systems of the body; 2) general principles for assessing the safety of chemicals and therapeutic efficacy of drugs; and 3) state-of-the-art molecular, biological, and genetic approaches to understanding drugs, toxicants, and disease through a combination of laboratory and lecture experiences. The B.S. degree in Toxicology provides a strong foundation for graduate work leading to a Ph.D. in most biomedical fields. Students may choose to pursue a Ph.D. degree in Pharmacology, Toxicology, Biochemistry, Physiology, Pathobiology, Oncology, or Molecular Biology. Alternatively, students prepare for employment as research technicians, drug/toxicant specialists, or pharmaceutical sales representatives.

Entrance to Major Requirements:
In order to be eligible for entrance to the Toxicology major, a student must have (1) attained at least a 2.00 cumulative grade point average and (2) earned a C grade or better in: BIOL 110, BIOL 230W, CHEM 110, CHEM 111, CHEM 112, CHEM 113, MATH 140 and MATH 141.

For the B.S. degree in Toxicology, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-2 credits
REQUIREMENTS FOR THE MAJOR: 92-94 credits
(This includes 15 credits of General Education courses; 9 credits of GN courses; 6 credits of GQ courses.)

PRESCRIBED COURSES (78 credits)
BIOL 110 GN(4)[1], CHEM 110 GN(3)[1], CHEM 111 GN(1)[1], CHEM 112 GN(3)[1], CHEM 113 GN(1)[1], MATH 140 GQ(4)[1], MATH 141 GQ(4)[1] (Sem: 1-2)
BB H/P A 440 US,IL(3), CHEM 210(3), CHEM 212(3), CHEN 213(2), VB SC 230(3) (Sem: 3-4)
PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 3-6)
BIOL 220W GN(4), BIOL 230W GN(4), BIOL 240W GN(4) (Sem: 3-6)
B M B 211(3), B M B 212(1), B M B 221(2), BIOL 472(3)[1], VB SC 330(3)[1] (Sem: 5-6)
E R M 431(3)[1], VB SC 430(3)[1], VB SC 433(3)[1], VB SC 451(3)[1] (Sem: 7-8)

ADDITIONAL COURSES (5-7 credits)
Select 3-4 credits from STAT 200 GQ(4) or STAT 250 GQ(3) (Sem: 3-4)
Select 2-3 credits from VB SC 395(1-10) or VB SC 496(1-18) (Sem: 6-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits of 400-level courses from department list [1] (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2012
Blue Sheet Item #: 41-02-002
Review Date: 10/02/2012
UCA Revision #1: 8/14/06
AG
Program Coordinator updated: 6/19/12

Turfgrass Science

University Park, College of Agricultural Sciences (TURF)
World Campus

PROFESSOR ANDREW McNITT, Program Coordinator

This major provides an integrated program of study that includes basic and applied sciences, business management courses and an internship to prepare students for careers in turfgrass management and related areas. By carefully selecting supporting courses and electives, students can adapt the program to meet a variety of professional interests and educational needs.

Employment opportunities include golf course maintenance, professional lawn care, grounds maintenance, sod production, sales and service, athletic field maintenance, and research technician.

With appropriate selection of science courses, students can prepare for graduate study leading to careers in teaching, research, and extension.

Entrance Requirement: A student wishing to transfer into the Turfgrass Science program must have completed CHEM 101 GN(3) or CHEM 110 GN(3) and received a grade of C or better in each course prior to declaring the major.

For the B.S. degree in Turfgrass Science, a minimum of 120 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(18 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in SUPPORTING COURSES AND RELATED AREAS course selections)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selections)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 4 credits

REQUIREMENTS FOR THE MAJOR: 89 credits
(This includes 18 credits of General Education courses: 3 credits of GWS courses; 6 credits of GQ courses; 9 credits of GN courses.)

PRESCRIBED COURSES (49 credits)
BIOL 127 GN(3), CHEM 202(3)[1], CMPSC 203 GO(4), MATH 021 GQ(3) (Sem: 1-4)
SOILS 101 GN(3)[1], TURF 230(1)[1], TURF 235(3)[1], TURF 495(3)[1] (Sem: 3-4)
ENT 317(3)[1], PPEM 412(3)[1], TURF 238(3)[1], TURF 434(3)[1] (Sem: 5-6)
A S M 307(3), TURF 425(3)[1], TURF 435(4)[1], TURF 436W(3)[1], TURF 490(1)[1] (Sem: 6-8)

ADDITIONAL COURSES (13 credits)
BIOL 011 GN(3), BIOL 012 GN(1); or BIOL 110 GN(4) (Sem: 1-4)
Wildlife and Fisheries Science

University Park, College of Agricultural Sciences (W F S)

PROFESSOR ELLEN MANNO, Program Coordinator

The purpose of the Wildlife and Fisheries Science major is to develop the knowledge, skills, and professional ethics of undergraduates interested in the conservation and management of fish and wildlife and their environments. The curriculum is designed to provide a broad-based science background that incorporates natural resource management principles that prepare our students for a diverse array of opportunities such as graduate school, natural resource management agencies, consulting firms, non-profits, etc. Students can choose from two options: Wildlife option and Fisheries option. Each option enables students to gain greater depth of knowledge in one area of the discipline. Coursework required for the Wildlife option meets The Wildlife Society's requirements for professional certification, and coursework required for the Fisheries option meets the American Fisheries Society's requirements for professional certification.

For the B.S. in Wildlife and Fisheries Science, a minimum of 120 credits is required for the Wildlife option and a minimum of 122 credits is required for the Fisheries option.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(21 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 3-9 credits

REQUIREMENTS FOR THE MAJOR: 87-95 credits
(This includes 21 credits of General Education courses; 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 3 credits of GWS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 69-72 credits

PRESCRIBED COURSES (45 credits)
BIOL 110 GN(4), BIOL 220W GN(4) [1], CHEM 110 GN(3), CHEM 111 GN(1) (Sem: 1-4)
BIOL 240W GN(4), CHEM 202(3), PHYS 250 GN(4), SOILS 101 GN(3), W F S 209 GN(3) [1] (Sem: 3-4)
ECON 104 GS(3), W F S 300(2) [1], W F S 301(2) [1], W F S 310(3) [1] (Sem: 5-6)
W F S 446(3), ENGL 202C GWS(3) (Sem: 7-8)

ADDITIONAL COURSES (18-21 credits)
MATH 110 GQ(4) [1] or MATH 140 GQ(4) [1]; MATH 111 GQ(2) or MATH 141 GQ(4) (Sem: 1-2)
AN SC 322(3), BIOL 133 GN(3), BIOL 222(3), or BIOL 230W GN(4) (Sem: 3-4)
STAT 240 GQ(3) or STAT 301 GQ(3) (Sem: 3-4)
FOR 350(3) or STAT 460(3) (Sem: 5-6)
AEE 440(3), CAS 211(3), ENGL 416(3), or ENGL 418(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in natural resource economics, policy, planning, law, administration, or human dimensions from departmental list (Sem: 5-8)

REQUIREMENTS FOR THE OPTION: 18-23 credits

FISHERIES OPTION: (22-23 credits)

PRESCRIBED COURSES (10 credits)
Women's Studies

University Park, College of the Liberal Arts (WS BA)

PROFESSOR MELISSA WRIGHT, Department Head

This interdisciplinary major is designed to develop a broad understanding of the study of women and women's perspectives in all areas of academic scholarship. The focus is on feminist analyses of women's lives, of women's social, cultural, and scientific contributions, and of the structure of sex/gender systems. The interdisciplinary and inclusive nature of the field is reflected in a curricular structure that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women's lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation.

For the B.A. degree in Women's Studies, a minimum of 123 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 18 credits

BACHELOR OF ARTS DEGREE REQUIREMENTS: 24 credits
(3 of these 24 credits are included in the REQUIREMENTS FOR THE MAJOR, GENERAL EDUCATION, or ELECTIVES and 0-12 credits are included in ELECTIVES if foreign language proficiency is demonstrated by examination.)
(See description of Bachelor of Arts Degree Requirements in this bulletin.)

REQUIREMENTS FOR THE MAJOR: 36 credits[1]

PRESCRIBED COURSES (9 credits)
WMNST 301 GH(3) (Sem: 1-4)
WMNST 400 US;IL(3) (Sem: 6-7)
WMNST 492W(3) (Sem: 7-8)

ADDITIONAL COURSES (6 credits)
Select 3 credits from WMNST 083S GH(3), WMNST 100 GS;US;IL(3) or WMNST 106 GS;US;IL(3) (Sem: 1-4)
Select 3 credits from WMNST 494(3), WMNST 495(3), WMNST 496(3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 6 credits from the program-approved list at the 100-200 level (Sem: 1-4)
Select 15 credits in Women's Studies from the program-approved list and in consultation with an adviser; at least 3 credits must be at the 400 level (Sem: 1-8):
a. 3 credits of arts and humanities courses
b. 6 credits of natural or social sciences courses
c. 3 credits that focus on non-Western women
d. 3 credits that focus on women of color in the United States

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Women's Studies

University Park, College of the Liberal Arts (WS BS)

PROFESSOR MELISSA WRIGHT, Department Head

This interdisciplinary major is designed to develop a broad understanding of the study of women and women’s perspectives in all areas of academic scholarship. The focus is on feminist analyses of women’s lives, of women’s social, cultural, and scientific contributions, and of the structure of sex/gender systems. The interdisciplinary and inclusive nature of the field is reflected in a curricular structure that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women’s lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation.

Students may choose either a Bachelor of Arts or a Bachelor of Science Program. The B.A. degree in Women’s Studies is a traditional Women’s Studies degree. The B.S. degree is intended for students with strong interest in quantitative skills, women’s health and sexuality, and/or women and science, or who wish to pursue a multiple major program with other B.S. degree programs.

For the B.S. degree in Women's Studies, a minimum of 120 credits is required.

Per Senate Policy 83-80.5, the college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. For more information, check the Recommended Academic Plan for your intended program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3-12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 21-30 credits

REQUIREMENTS FOR THE MAJOR: 57 credits
(This includes 3-12 credits of General Education courses: 3-6 credits of GQ courses, 0-3 credits of GH courses, and 0-3 credits of GS courses.)

PRESCRIBED COURSES (6 credits)
WMNST 301 GH(3) (Sem: 1-4)
WMNST 492W(3) (Sem: 7-8)

ADDITIONAL COURSES (36 credits)
Select 3 credits from WMNST 100 GS;US;IL(3) or WMNST 106 GS;US;IL(3) (Sem: 1-4)
Select 3 credits from WMNST 400 US;IL(3) or WMNST 401(3) (Sem: 5-8)
Select 3 credits from WMNST 494(3), WMNST 495(3), or WMNST 496(3) (Sem: 5-8)
Select 27 credits in Women's Studies from the program-approved lists. At least 9 credits must be at the 400 level. The same course may be used to fulfill more than one requirement within Additional Courses. (Sem: 1-8).
c. at least 6 credits that focus on women’s health and sexuality or women in science and technology: WMNST 005(3),
WMNST 205(3), WMNST 452(3), WMNST 457(3), WMNST 458(3) (Sem: 1-8)
d. at least 3 credits that focus on non-Western women: WMNST 102 GH(3), WMNST 202 GS(3), WMNST 420(3), WMNST 476W(3) (Sem: 1-8)
e. at least 3 credits that focus on women of color in the United States: WMNST 101 GH(3), WMNST 103(3), WMNST 136 GS(3), WMNST 205(3), WMNST 410(3) (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits total from groups a, b, and c, with at least 3 credits from each group.
a. Quantification (GQ) and Research Methods (Sem: 1-8)
b. Values, Ethics, and Scientific Inquiry (Sem: 1-8)
c. Social and behavioral sciences, health sciences, or natural sciences (Sem: 1-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2004
Blue Sheet Item #: 32-01-081
Review Date: 9/2/03

Workforce Education and Development

University Park, College of Education (WF ED)

PROFESSOR MARK THREETON, Undergraduate Coordinator

This major leads to the B.S. degree and may also lead to certification as a career and technical education teacher, and/or a coordinator of cooperative education, provided other requirements of the Pennsylvania Department of Education are met. The Industrial Training option does not lead to teacher certification.

To be certified by the Pennsylvania Department of Education as a career and technical education teacher, a person must have sufficient employment experience beyond the learning period to establish competency in the occupation to be taught. Further interpretation of this requirement may be secured by contacting the Department of Learning and Performance Systems. (See also Teacher Education Programs.)

Baccalaureate degree candidates must meet the following requirements by the end of their fourth semester to be admitted to the Workforce Education (WF ED) major:

1. Complete ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), ENGL 015 GWS(3) or ENGL 030 GWS(3), WF ED 101(1)
2. Complete 3 credits in literature (GH)
3. Complete 6 credits in Quantification (GQ)
4. Minimum 3.00 cumulative GPA
5. Meet PRAXIS PPST-READING current qualifying scores
6. Meet PRAXIS PPST-WRITING current qualifying scores
7. Meet PRAXIS PPST-MATHEMATICS current qualifying scores
8. Complete and document a minimum of 80 hours of experience

For the B.S. degree in Workforce Education and Development, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credits

REQUIREMENTS FOR THE MAJOR: 81-82 credits
(This includes 3 credits of General Education GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 38 credits[18]

PRESCRIBED COURSES (35 credits)
ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), WF ED 001(3), WF ED 101(1), WF ED 105(3), WF ED 323(3) (Sem: 3-6)
WF ED 445(3) (Sem: 3-8)
WF ED 106(3), WF ED 207W(3), WF ED 413(3), WF ED 441(2) (Sem: 5-8)
WF ED 442(2) (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2004
Blue Sheet Item #: 32-01-081
Review Date: 9/2/03

Workforce Education and Development

University Park, College of Education (WF ED)

PROFESSOR MARK THREETON, Undergraduate Coordinator

This major leads to the B.S. degree and may also lead to certification as a career and technical education teacher, and/or a coordinator of cooperative education, provided other requirements of the Pennsylvania Department of Education are met. The Industrial Training option does not lead to teacher certification.

To be certified by the Pennsylvania Department of Education as a career and technical education teacher, a person must have sufficient employment experience beyond the learning period to establish competency in the occupation to be taught. Further interpretation of this requirement may be secured by contacting the Department of Learning and Performance Systems. (See also Teacher Education Programs.)

Baccalaureate degree candidates must meet the following requirements by the end of their fourth semester to be admitted to the Workforce Education (WF ED) major:

1. Complete ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), ENGL 015 GWS(3) or ENGL 030 GWS(3), WF ED 101(1)
2. Complete 3 credits in literature (GH)
3. Complete 6 credits in Quantification (GQ)
4. Minimum 3.00 cumulative GPA
5. Meet PRAXIS PPST-READING current qualifying scores
6. Meet PRAXIS PPST-WRITING current qualifying scores
7. Meet PRAXIS PPST-MATHEMATICS current qualifying scores
8. Complete and document a minimum of 80 hours of experience

For the B.S. degree in Workforce Education and Development, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credits

REQUIREMENTS FOR THE MAJOR: 81-82 credits
(This includes 3 credits of General Education GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 38 credits[18]

PRESCRIBED COURSES (35 credits)
ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), WF ED 001(3), WF ED 101(1), WF ED 105(3), WF ED 323(3) (Sem: 3-6)
WF ED 445(3) (Sem: 3-8)
WF ED 106(3), WF ED 207W(3), WF ED 413(3), WF ED 441(2) (Sem: 5-8)
WF ED 442(2) (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2004
Blue Sheet Item #: 32-01-081
Review Date: 9/2/03

Workforce Education and Development

University Park, College of Education (WF ED)

PROFESSOR MARK THREETON, Undergraduate Coordinator

This major leads to the B.S. degree and may also lead to certification as a career and technical education teacher, and/or a coordinator of cooperative education, provided other requirements of the Pennsylvania Department of Education are met. The Industrial Training option does not lead to teacher certification.

To be certified by the Pennsylvania Department of Education as a career and technical education teacher, a person must have sufficient employment experience beyond the learning period to establish competency in the occupation to be taught. Further interpretation of this requirement may be secured by contacting the Department of Learning and Performance Systems. (See also Teacher Education Programs.)

Baccalaureate degree candidates must meet the following requirements by the end of their fourth semester to be admitted to the Workforce Education (WF ED) major:

1. Complete ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), ENGL 015 GWS(3) or ENGL 030 GWS(3), WF ED 101(1)
2. Complete 3 credits in literature (GH)
3. Complete 6 credits in Quantification (GQ)
4. Minimum 3.00 cumulative GPA
5. Meet PRAXIS PPST-READING current qualifying scores
6. Meet PRAXIS PPST-WRITING current qualifying scores
7. Meet PRAXIS PPST-MATHEMATICS current qualifying scores
8. Complete and document a minimum of 80 hours of experience

For the B.S. degree in Workforce Education and Development, a minimum of 124 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 45 credits
(3 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in ELECTIVES or GENERAL EDUCATION course selection)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

ELECTIVES: 0-1 credits

REQUIREMENTS FOR THE MAJOR: 81-82 credits
(This includes 3 credits of General Education GS courses.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 38 credits[18]

PRESCRIBED COURSES (35 credits)
ECON 102 GS(3) or ECON 104 GS(3); EDPSY 014(3), EDTHP 115(3), WF ED 001(3), WF ED 101(1), WF ED 105(3), WF ED 323(3) (Sem: 3-6)
WF ED 445(3) (Sem: 3-8)
WF ED 106(3), WF ED 207W(3), WF ED 413(3), WF ED 441(2) (Sem: 5-8)
WF ED 442(2) (Sem: 7-8)
ADDITIONAL COURSES (3 credits)
WF ED 450 US;IL(3), INSYS 100 GS;IL(3), or S T S 245 GS;IL(3) (Sem: 3-6)

REQUIREMENTS FOR THE OPTION: 43-44 credits

HEALTH OCCUPATIONS EDUCATION OPTION: (43 credits)[18]

PRESCRIBED COURSES (34 credits)
WF ED 395C(24) (Sem: 5-8)
WF ED 495C(10) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in course work related to the student's field of study (Sem: 3-8)
(Students may apply 6 credits of ROTC.)

INDUSTRIAL EDUCATION OPTION: (43 credits)[18]

PRESCRIBED COURSES (34 credits)
WF ED 395A(24) (Sem: 5-8)
WF ED 495C(10) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in course work related to the student's field of study (Sem: 3-8)
(Students may apply 6 credits of ROTC.)

INDUSTRIAL TRAINING OPTION: (44 credits)[18]

PRESCRIBED COURSES (35 credits)
WF ED 270(3) (Sem: 3-6)
WF ED 471(3) (Sem: 5-6)
WF ED 395D(24) (Sem: 5-8)
WF ED 495D(5) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in course work related to the student's field of study (Sem: 3-8)
(Students may apply 6 credits of ROTC.)

OCCUPATIONAL HOME ECONOMICS EDUCATION OPTION: (43 credits)[18]

PRESCRIBED COURSES (34 credits)
WF ED 395B(24) (Sem: 5-8)
WF ED 495C(10) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits in course work related to the student's field of study (Sem: 3-8)
(Students may apply 6 credits of ROTC.)

A grade of C or better per course is required for teacher certification.

Last Revised by the Department: Summer Session 2009

Blue Sheet Item #: 37-04-013
Review Date: 1/13/09

ED

World Languages (K-12) Education

University Park, College of Education (WL ED)

PROFESSOR MATTHEW POEHNER, Undergraduate Coordinator

The World Languages Education major helps prepare students for kindergarten through high school teaching positions and for other employment in fields related to their content language areas.

The following teaching options are available for majors in World Languages Education: Bilingual Education, English as a Second Language, French, German, Latin, Russian, and Spanish. Pennsylvania does not issue a teacher certificate in Bilingual Education; many other states do. Completers of the English as a Second Language (ESL) option may qualify for the Pennsylvania Program Specialist: ESL credential if they hold a Pennsylvania teacher certificate.

BILINGUAL EDUCATION TEACHING OPTION: Although Pennsylvania does not issue a teacher certificate in Bilingual Education, other states do. Thus, completion of this option as well as any tests or requirements stipulated by the pertinent state department of education (other than Pennsylvania) should lead to a teacher certificate in Bilingual Education. In addition to the Common Requirements of the World Languages Education major, candidates select one of the language emphases, i.e., French, German, Latin, Russian, or Spanish, complete the courses associated with that emphasis and also the Common Requirements for all Emphases. Consequently, candidates also become eligible for teacher certification in the language selected as their language emphasis. Further, completers of this B.S. degree and option may also become eligible for the English as a Second Language (ESL) credential by completing six additional credits, i.e., APLNG 410 or APLNG 484, and APLNG 493.

Candidates are expected to have taken their choice of language coursework beyond the intermediate level to be eligible for enrollment in FR 201, or GER 201, or LATIN 400, or RUS 204, or SPAN 200. In general, students are encouraged to take at least one course in the chosen language each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

ENGLISH AS A SECOND LANGUAGE (ESL) TEACHING OPTION: This option will lead to a baccalaureate degree only in
conjunction with one of the other companion World Language Education Teaching options.

The ESL Teaching option is a joint offering of the Department of Curriculum and Instruction in the College of Education and the Department of Linguistics and Applied Language Studies in the College of the Liberal Arts. Dr. Youb Kim, Assistant Professor of Education and Applied Linguistics, and Joan Kelly Hall, Professor of Linguistics and Applied Linguistics, are co-directors of the program.

This option prepares candidates for advanced work in ESL and for the Pennsylvania teacher credential Program Specialist: English as a Second Language (ESL). However, the Pennsylvania Department of Education only issues the Program Specialist: ESL credential to holders of Pennsylvania Instructional I or II certificates. Thus, completers of another World Languages Education Teaching option may first seek the Pennsylvania Instructional certificate in that language and may then add the Program Specialist: ESL credential, subsequently.

**FRENCH TEACHING OPTION:** Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in French. Candidates are expected to have taken French coursework beyond the intermediate level to be eligible for enrollment in FR 201. In general, students are encouraged to take at least one course in French each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**GERMAN TEACHING OPTION:** Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in German. Candidates are expected to have taken German coursework beyond the intermediate level to be eligible for enrollment in GER 201. In general, students are encouraged to take at least one course in German each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**LATIN TEACHING OPTION:** Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Latin. Candidates are expected to have taken Latin coursework beyond the intermediate level to be eligible for enrollment in LATIN 400. In general, students are encouraged to take at least one course in Latin each semester without interruption. Participation in an approved Education Abroad Study Program is highly recommended, typically during semester six.

**RUSSIAN TEACHING OPTION:** Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Russian. Candidates are expected to have taken Russian coursework beyond the intermediate level to be eligible for enrollment in RUS 204. In general, students are encouraged to take at least one course in Russian each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

**SPANISH TEACHING OPTION:** Completion of this option and pertinent tests required by the Pennsylvania Department of Education lead to the Pennsylvania Instructional I teacher certificate in Spanish. Candidates are expected to have taken Spanish coursework beyond the intermediate level to be eligible for enrollment in SPAN 110. In general, students are encouraged to take at least one course in Spanish each semester without interruption. Participation in an approved Education Abroad Study Program is required, typically during semester six.

Baccalaureate degree candidates must meet the following requirements 1-3 by the end of their third semester:

1. A minimum cumulative grade point average of 3.00
2. Either qualifying scores from the PECT PAPA for Reading, Writing and Mathematics; or qualifying SAT scores for the combined and individual Critical Reading, Writing, and Mathematics sections; or qualifying American College Test Plus Writing composite and individual English/Writing score and Math score as specified by the Pennsylvania Department of Education.
3. Documentation of at least 80 hours of volunteer or paid education work experience with learners of the age group the candidate plans to teach. Candidates for World Languages Education must document 40 of these hours with learners who come from backgrounds that are different from the candidate’s.

Requirements 4-9 must be met by the end of the fourth semester when students typically participate in the Entrance to Major process.

4. A grade of “C” or better in all specified courses.
5. Completion of an early field experience specified by the certification program.
6. Completion of a core of Education courses specified by the certification program.
7. Completion of additional credits as specified by the certification program.
8. Completion of at least 48 semester credit hours, including ENGL 015 GWS(3) or ENGL 030 GWS(3), three credits of literature, and six credits of quantification.
9. Language proficiency as described below.
10. Approval from the professional education adviser or the head of the pertinent certification program.

**French Option:**
- Proficiency equivalent through FR 003
- Literature selection options in language: FR 351 or 352
- FR 201 and 202

**Spanish Option:**
- Proficiency equivalent through SPAN 003
- Literature selection options in language: SPAN 210, 220, or 253
- SPAN 215

**German Option:**
- Proficiency equivalent through GER 003
- Literature selection options in language: GER 310
- GER 201

**Russian Option:**
- Proficiency equivalent through: RUS 003
Literature selection options in language: RUS 304  
RUS 204  

Latin Option:  
Proficiency equivalent through: LATIN 003  

Literature selection options in language: CAMS 045, LATIN 404  

For the B.S. degree in World Languages Education with a dual certification option in Bilingual Education Teaching, a minimum of 140 credits is required; with an option in English as a Second Language (ESL) Teaching, a minimum of 136 credits is required, i.e., a minimum of 123 credits for the companion World Languages Education Teaching option selected, plus 12 credits to meet eligibility for the Program Specialist: ESL credential; with an option in French Teaching, a minimum of 128 credits is required; with an option in German Teaching, a minimum of 126 credits is required; with an option in Latin Teaching, a minimum of 125 credits is required; with an option in Russian Teaching, a minimum of 124 credits is required; with an option in Spanish Teaching, a minimum of 128 credits is required. (See also Teacher Education Programs.)  

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)  

GENERAL EDUCATION: 45 credits  
(9-12 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)  
(See description of General Education in this bulletin.)  

FIRST-YEAR SEMINAR:  
(Included in ELECTIVES or GENERAL EDUCATION course selection)  

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:  
(Included in ELECTIVES, GENERAL EDUCATION course selection, or REQUIREMENTS FOR THE MAJOR)  

WRITING ACROSS THE CURRICULUM:  
(Included in REQUIREMENTS FOR THE MAJOR)  

ELECTIVES: 1 credit  

REQUIREMENTS FOR THE MAJOR: 88-106 credits  
(This includes 9-12 credits of General Education GS and GH courses.)  

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 55 credits [18]  

PRESCRIBED COURSES (52 credits)  
EDPSY 014(3), EDTHP 115(3), HD FS 229 GS(3), C I 295(3), WL ED 300(3) (Sem: 1-4)  

ADDITIONAL COURSES  
PSYCH 412(3) or HD FS 239 GS(3) (Sem: 3-6)  

REQUIREMENTS FOR THE OPTION: 33-51 credits  

BILINGUAL EDUCATION TEACHING OPTION: (48-51 credits)  

PRESCRIBED COURSES (9 credits)  
WL ED 414(3), WL ED 422(3), WL ED 444(3) (Sem 5-7)  

ADDITIONAL COURSES (39-42 credits)  
Select 6 credits of 300- or 400-level option-related courses, with departmental recommendation (Sem: 5-7)  
Select 33-36 credits from one of the following emphasizes areas (proficiency in the language of choice must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in FR 201 or GER 201 or LATIN 400 or RUS 204 or SPAN 110):  

a. French Emphasis (36 credits)  
Prescribed Courses (24 credits)  
FR 201 IL(3), FR 202(3), FR 331(3), FR 332(3) (Sem: 3-5)  
FR 316(3), FR 401(3), FR 402Y(3), FR 440(3) (Sem: 5-8)  
Additional Courses (12 credits)  
Select 3 credits from FR 137 GH;IL(3), FR 138 GH(3), FR 139 GH;IL(3) (Sem: 1-4)  
Select 3 credits from FR 317(3), FR 352(3), FR 460(3) (Sem: 4-7)  
Select 3 credits from FR 417(3), FR 418(3) (Sem: 4-7)  
Select 3 credits from FR 430(3), FR 458 IL(3), FR 470 IL(3), FR 471 IL(3), FR 489(3) (Sem: 5-7)  

b. German Emphasis (34 credits)  
Prescribed Courses (19 credits)  
GER 201 IL(4), GER 301 IL(3), GER 310 IL(3), GER 344 IL(3), GER 401Y IL(3), GER 411(3) (Sem: 3-7)  
Additional Courses (15 credits)  
Select 3 credits from GER 157 GH;US(3), GER 200 GH;IL(3) (Sem: 1-4)  
Select 3 credits from GER 412 IL(3), GER 430 IL(3) (Sem: 4-6)  
Select 3 credits from GER 431 IL(3), GER 432 IL(3) (Sem: 4-6)  
Select 3 credits from GER 480 IL(3), GER 481 IL(3), GER 482 IL(3) (Sem: 4-6)  
Select 3 credits from GER 399 IL(3), GER 440 IL(3), GER 482 IL(3), GER 497(1-9), GER 499 IL(3) (Sem: 5-8)  

c. Latin Emphasis (33 credits)  
Prescribed Courses (24 credits)  
CAM 005 GH;IL(3), CAMS 050 GH(3), CAMS 400W(3), LATIN 404(3), LING 102 GH(3) (Sem: 3-5)  
LATIN 402(3), LATIN 403(3), LATIN 450W(3) (Sem: 5-8)  
Additional Courses (9 credits)  
Select 3 credits from ANTH 045 GS;US;IL(3), CAMS 033 GH;IL(3), CAMS 045 GH;IL(3) (Sem: 1-4)
Select 3 credits from CAMS 101 GH;IL(3), CAMS 150 GH;IL(3) (Sem 3-5)
Select 3 credits from CAMS 440W(3), CAMS 497(1-9), LATIN 400(3), LATIN 420(3), LATIN 497(1-9) (Sem: 5-8)

d. Russian Emphasis (35 credits)

Prescribed Courses (23 credits)
RUS 204 IL(4), RUS 214 IL(4) (Sem: 3-5)
RUS 304 IL(3), RUS 305 IL(3), RUS 400 IL(3), RUS 412 IL(3), RUS 450 IL(3) (Sem: 5-8)

Additional Courses (12 credits)
Select 3 credits from RUS 100 GH;IL(3), RUS 110 GH;IL(3), RUS 120 GH;IL(3) (Sem: 1-4)
Select 3 credits from RUS 130 IL(3), RUS 141Y(3), RUS 142Y(3), RUS 143 GH;IL(3) (Sem: 1-4)
Select 3 credits from RUS 450 IL(3), RUS 497(1-9) (Sem: 1-4)
Select 3 credits from RUS 426 IL(3), RUS 427 IL(3), RUS 494(3), RUS 497(1-9), RUS 499 IL(3) (Sem: 5-8)

e. Spanish Emphasis (33 credits)

Prescribed Courses (21 credits)
SPAN 110(3), SPAN 215(3), SPAN 253W(3), (Sem: 3-5)
SPAN 410(3), SPAN 412(3), SPAN 414(3), SPAN 440(3) (Sem: 5-8)

Additional Courses (12 credits)
Select 3 credits from SPAN 210(3), SPAN 220(3) (Sem: 1-4)
Select 3 credits from SPAN 415(3), SPAN 418(3) (Sem: 5-7)
Select 3 credits from SPAN 305(3), SPAN 353(3), SPAN 354(3), SPAN 355(3), SPAN 356(3), SPAN 399 IL(3) (Sem: 4-6)
Select 3 credits from SPAN 399 IL(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9) (Sem: 5-8)

ENGLISH AS A SECOND LANGUAGE (ESL) TEACHING OPTION: (45-49 credits)
Select 33-37 credits: This option must be taken in conjunction with one of the other World Languages Education Teaching Options.

PRESCRIBED COURSES (9 credits)
APLNG 493(3), WL ED 444(3), WL ED 483(3) (Sem: 4-7)

ADDITIONAL COURSES (3 credits)
APLNG 410(3) or APLNG 484(3) (Sem: 5-7)

Holders of a baccalaureate degree and a valid Pennsylvania Instructional certificate, who seek only the Program Specialist: English as a Second Language credential, must complete the 15 credits of Prescribed and Additional Courses listed below. Typically, they do so in connection with other post-baccalaureate studies.

PRESCRIBED COURSES (12 credits)
APLNG 493 IL(3), WL ED 300(3), WL ED 444(3), WL ED 483(3) (Sem: 4-7)

ADDITIONAL COURSES (3 credits)
APLNG 410(3) or APLNG 484(3) (Sem: 5-7)

FRENCH TEACHING OPTION: (36 credits)

PRESCRIBED COURSES (24 credits)
(Proficiency in French must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in FR 201.)
FR 201 IL(3), FR 202 IL(3), FR 331 IL(3), FR 332 IL(3) (Sem: 3-5)
FR 316(3), FR 401 IL(3), FR 402Y IL(3), FR 440 IL(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
FR 137 GH;IL(3) or FR 138 GH(3) or FR 139 GH;IL(3) (Sem: 1-4)
FR 351 IL(3) or FR 352 IL(3) or FR 460 IL(3); FR 417 IL(3) or FR 418 IL(3) (Sem: 4-6)
Select 3 credits from FR 430 IL(3), FR 458 IL(3), FR 470 IL(3), FR 471 IL(3), FR 489 IL(3) (Sem: 6-7)

GERMAN TEACHING OPTION: (34 credits)

PRESCRIBED COURSES (19 credits)
(Proficiency in German must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in GER 201.)
GER 201 IL(4), GER 301 IL(3), GER 310 IL(3), GER 344 IL(3) (Sem: 3-5)
GER 401Y IL(3), GER 411(3) (Sem: 4-7)

ADDITIONAL COURSES (15 credits)
GER 157 GH;US(3) or GER 200 GH;IL(3) (Sem: 1-4)
GER 412 IL(3) or GER 430 IL(3); GER 431 IL(3) or GER 432 IL(3); GER 480 IL(3) or GER 481 IL(3) or GER 482 IL(3) (Sem: 4-6)
Select 3 credits from GER 399 IL(3), GER 440 IL(3), GER 482 IL(3), GER 497(1-9), GER 499 IL(3) (Sem: 5-8)

LATIN TEACHING OPTION: (33 credits)

PRESCRIBED COURSES (24 credits)
(Proficiency in Latin must be demonstrated by either examination or coursework equivalent to the completion of 12 credits in order to enroll in LATIN 400 or other 400-level Latin courses.)
CAM 050 GH(3), CAMS 440W(3), LATIN 404(3), LING 102 GH(3) (Sem: 3-5)
CAM 005 GH;IL(3), LATIN 402(3), LATIN 403(3), LATIN 450W(3) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)
CAM 033 GH;IL(3) or CAMS 045 GH;IL(3) (Sem: 1-4)
CAM 101 GH(3) or CAMS 150 GH;IL(3) (Sem: 3-5)
Select 3 credits from CAMS 440W(3), CAMS 497(1-9), LATIN 400(3), LATIN 420(3), LATIN 497(1-9) (Sem: 5-8)

RUSSIAN TEACHING OPTION: (35 credits)

PRESCRIBED COURSES (23 credits)
(Proficiency in Russian must be demonstrated by either examination or coursework equivalent to the completion of 12
credits in order to enroll in RUS 204.)
RUS 204 IL(4), RUS 214 IL(4), RUS 304 IL(3), RUS 305 IL(3) (Sem: 3-5)
RUS 400 IL(3), RUS 412 IL(3), RUS 450 IL(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
RUS 100 GH;IL(3) or RUS 110 GH;IL(3) or RUS 120 GH;IL(3); RUS 130 IL(3) or RUS 141Y(3) or RUS 142Y(3) or RUS 143
GH;IL(3) (Sem: 1-4)
Select 3 credits from RUS 450 IL(3) or RUS 497(1-9) (Sem: 4-6)
Select 3 credits from RUS 426 IL(3), RUS 427 IL(3), RUS 494(3), RUS 497(1-9), RUS 499 IL(3) (Sem: 6-8)

SPANISH TEACHING OPTION: (33 credits)
PRESCRIBED COURSES (21 credits)
(Proficiency in Spanish must be demonstrated by either examination or coursework equivalent to enroll in SPAN 110.)
SPAN 110(3), SPAN 215(3), SPAN 253W(3) (Sem: 3-5)
SPAN 410(3), SPAN 412(3), SPAN 414(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
SPAN 210(3) or SPAN 220(3) (Sem: 1-4)
SPAN 415(3) or SPAN 418(3) (Sem: 5-8)
Select 3 credits from SPAN 305(3), SPAN 353(3), SPAN 354(3), SPAN 355(3), SPAN 356(3), SPAN 399 IL(3) (Sem: 4-6)
Select 3 credits from SPAN 399 IL(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(1-9) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[18] A grade of C or better per course is required for teacher certification.
Select 6 credits from FORT 210(3), FORT 260(3), WILDL 101(3), or WILDL 207(3) (Sem: 3-4)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-009
Review Date: 8/25/15
UCA Revision #: 8/4/06

**Hotel, Restaurant, and Institutional Management**

*University Park, College of Health and Human Development (2HRIM)*

**JENNIFER P. WAKEMAN, Coordinator, Penn State Berks**

The Hotel, Restaurant, and Institutional Management major is an intensive four-semester major designed to prepare students for managerial positions in the hospitality industry. The course of study places heavy reliance on experience acquired in an on-the-job setting.

Students who achieve outstanding records may, upon completing this program, apply for admission to the baccalaureate degree major in Hotel, Restaurant, and Institutional Management in the College of Health and Human Development. Six or more additional semesters of satisfactory work are required to earn the baccalaureate degree. Graduates of this major may qualify for admission to other baccalaureate degree majors.

For the Associate in Science degree in Hotel, Restaurant, and Institutional Management, a minimum of 60 credits is required.

**Scheduling Recommendation by semester given like (Sem: 1-2)**

**GENERAL EDUCATION:** 21 credits
(6 of these 21 credits are included in REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**REQUIREMENTS FOR THE MAJOR:** 45 credits
(This includes 6 credits of General Education GWS courses.)

**PRESCRIBED COURSES** (35 credits)
ENGL 015 GWS(3)[70], ENGL 202D GWS(3)[70], HRIM 201(3)[70], HRIM 228(1)[70], HRIM 250(3)[1], HRIM 270(4)[1], HRIM 295W(3), HRIM 319(3)[70], HRIM 329(3)[70], HRIM 335(3)[70], HRIM 336(3)[70], HRIM 380(3)[70] (Sem: 1-4)

**ADDITIONAL COURSES** (6 credits)
HRIM 204(3) or MKTG 221(3)[70] (Sem: 1-4)
HRIM 260(3) or MGMT 341(3) (Sem: 1-4) [70]

**SUPPORTING COURSES AND RELATED AREAS** (4 credits)
Select 4 credits in consultation with adviser to develop more depth in hospitality management (Sem: 1-4)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.
[70] These courses are required for the baccalaureate degree in Hotel, Restaurant, and Institutional Management.

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 39-01-101
Review Date: 08/24/2010

**HH**

**Information Sciences and Technology**

*Berks College (2ISBL)*

**Continuing Education, University Park (2 IST)**

**University College:** Penn State DuBois, Penn State Fayette, Penn State Hazleton, Penn State Lehigh Valley, Penn State Mont Alto, Penn State New Kensington, Penn State Wilkes-Barre, Penn State Worthington Scranton, Penn State York (2ISCC) World Campus

Not all options are available at every campus. Contact the campus you are interested in attending to determine which options are offered.

**PROFESSOR MARY BETH ROSSON, Associate Dean for Graduate and Undergraduate Studies**

This associate degree major is structured to prepare graduates for immediate and continuing employment opportunities in the broad disciplines of information science and technology. This includes positions such as application programmers, associate systems designers, network managers, Web designers and administrators, or information systems support specialists. Specifically, the major is designed to ensure a thorough knowledge of information systems and includes
extensive practice using contemporary technologies in the creation, organization, storage, analysis, evaluation, communication, and transmission of information. The major fosters communications, interpersonal, and group interaction skills through appropriate collaborative and active learning projects and experiences. Technical material covers the structure of database systems, Web and multi-media systems, and considerations in the design of information systems. Team projects in most courses, a required internship, and a second-year capstone experience provide additional, focused venues for involving students in the cutting-edge issues and technologies in the field.

The Associate of Science in IST degree will be offered at multiple campuses within the Penn State system of colleges and campuses. Note that not all options will be available at all locations.

Baccalaureate Option: This option provides maximum articulation with the baccalaureate degree. Students who complete this option will meet all lower division requirements for the baccalaureate degree. This is not the case with the remaining options, although the degree of articulation is quite high for all associate degree options.

Generalized Business Option: This option enables students to specialize in the general business areas of accounting, marketing, and management.

Individualized Option: This option enables students to work closely with an adviser to develop a plan of study that meets the dual objectives of allowing a flexible academic program and providing breadth of technical specialization. An example would be a program where a student would take some of the courses listed in the Web Administration option and the remainder in the Software option.

Software Option: This option prepares graduates for entry-level programming support positions in industry. Students take courses in Web programming, database programming, and other contemporary programming environments.

Networking Option: This option prepares graduates for positions as entry-level computer network administrators. Students take courses in personal computer hardware, networking essentials, and network administration.

Telecommunications Option: This option prepares graduates for entry-level positions in the telecommunications industry. Students take courses in voice and data communications, protocols, networks, and wireless systems.

For the Associate in Science degree in IST, a minimum of 60 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 21 credits
(9-12 of these 21 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See the description of General Education in this bulletin.)

ELECTIVES: 4-7 credits

REQUIREMENTS FOR THE MAJOR: 44-46 credits
(This includes 9-12 credits of General Education courses, i.e., ALL options: 3 credits of GQ courses; 6 credits of GWS courses. The Baccalaureate Option also includes 3 credits of GS courses to equal a total of 12 credits that double count; the General Business Option also includes 0-3 credits of GS courses to equal 9-12 credits that double count.)

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): 29 credits

PRESCRIBED COURSES (25 credits)
CMSC 101 GQ[1] (Sem: 1-2)
CAS 100B GWS[1] or CAS 111S(1)[1], IST 110 GS[3][1], IST 210(3)[1], IST 220(3)[1], IST 250(3)[1], ENGL 015 GWS(3) (Sem: 1-2)
IST 260W(3)[1] (Sem: 3-4)

ADDITIONAL COURSES (4 credits)
ENGL 202C GWS(3) or ENGL 202D GWS(3) (Sem: 3-4)
IST 295A(1) or IST 295B(1)[1] (Sem: 3-4)

REQUIREMENTS FOR THE OPTION: 15-17 credits

BACCALAUREATE OPTION: (17 credits)

PRESCRIBED COURSES (13 credits)
IST 230(3)[1] and IST 240(3)[1] (Sem: 3-4)
ECON 102 GS(3) (Sem: 3-4)
STAT 200 GQ(4) (Sem: 3-4)

ADDITIONAL COURSES (4 credits)
MATH 110 GQ(4) or MATH 140 GQ(4) (Sem: 1-2)

GENERALIZED BUSINESS OPTION: (15-16 credits)

ADDITIONAL COURSES (15-16 credits)
Select 15 credits in consultation with an adviser from the following list: (Sem:1-4)
ENCC 102 GS(3), ENCC 104 GS(3), or ENCC 014 GS(3)
MATH 017 GQ(3), MATH 021 GQ(3), MATH 022 GQ(3), or MATH 026 GQ(3)

INDIVIDUALIZED OPTION: (15 credits)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits in consultation with an adviser that follow a coherent theme in information sciences and technology with a grade of C or better required for all IST [1] courses. (Sem: 1-4)

SOFTWARE OPTION: (15 credits)

PRESCRIBED COURSES (12 credits)
CMPSC 302(3) (Sem: 2-4)
IST 211(3)[1], IST 247(3)[1], and IST 256(3)[1] (Sem: 3-4)

ADDITIONAL COURSES (3 credits)
MATH 017 GQ(3), MATH 021 GQ(3), MATH 022 GQ(3), or MATH 026 GQ(3) (Sem: 1-2)

NETWORKING OPTION: (15 credits)

PRESCRIBED COURSES (12 credits)
IST 225(3)[1], IST 226(3)[1], IST 227(3)[1], and IST 228(3)[1] (Sem: 3-4)

ADDITIONAL COURSES (3 credits)
MATH 017 GQ(3), MATH 021 GQ(3), MATH 022 GQ(3), or MATH 026 GQ(3) (Sem: 1-2)

TELECOMMUNICATIONS OPTION: (15 credits)

PRESCRIBED COURSES (12 credits)
IST 221(3)[1], IST 222(3)[1], IST 223(3)[1], and IST 224(3)[1] (Sem: 3-4)

ADDITIONAL COURSES (3 credits)
MATH 017 GQ(3), MATH 021 GQ(3), MATH 022 GQ(3), or MATH 026 GQ(3) (Sem: 1-2)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-03-087
Review Date: 11/18/2014
UCA Revision #2: 7/27/07

Letters, Arts, and Sciences

Abington College (2LAAB)
Altoona College (2LAAL)
Penn State Erie, The Behrend College (2LABC)
Berks College (2LABL)
Penn State Harrisburg (2LACA)
University College (2LACC); Penn State Brandywine, Penn State DuBois, Penn State Fayette, Penn State Hazleton, Penn State Mont Alto, Penn State New Kensington, Penn State Schuylkill, Penn State Shenango Valley, Penn State Wilkes-Barre, Penn State Worthington-Scranton
University Park, College of the Liberal Arts (2 LAS)
World Campus

ASSOCIATE DEAN CHRISTOPHER P. LONG, in charge, Penn State University Park

The objectives of the Letters, Arts, and Sciences major are to broaden the student's understanding, interests, and skills; to help the student become a more responsible, productive member of the family and community; and to offer a degree program with sufficient electives to permit some specialization according to the student's interests or career plans. Letters, Arts, and Sciences is a complete two-year degree major. However, graduates who later seek admission to baccalaureate degree majors may apply baccalaureate credits toward the new degree.

In addition to a wide variety of baccalaureate majors offered at University Park campus, graduates of the Letters, Arts, and Sciences major may qualify for admission to the baccalaureate degree majors in Behavioral Sciences, Elementary Education, Humanities, or Public Policy offered at Penn State Harrisburg. Or they may qualify for any of a large number of baccalaureate degree majors offered by Penn State Erie, The Behrend College, in business, the liberal arts, and sciences.

For the Associate in Arts degree in Letters, Arts, and Sciences, a minimum of 60 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 21 credits
(6 of these 21 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

ELECTIVES: 15 credits

REQUIREMENTS FOR THE MAJOR: 30 credits#1
(This includes 6 credits of General Education GWS courses.)

PRESCRIBED COURSES (6 credits)
ENGL 015 GWS(3) (Sem: 1-2)
CAS 100 GWS(3) (Sem: 3-4)

ADDITIONAL COURSE (3 credits)
ENGL 202A GWS(3), ENGL 202B GWS(3), ENGL 202C GWS(3), or ENGL 202D GWS(3) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 3 credits in any course designated as arts* (Sem: 1-4)
Select 3 credits in any course designated as humanities* (Sem: 1-4)
Select 3 credits in any course designated as social and behavioral sciences* (Sem: 1-4)
Select 3 credits in any course designated as physical, biological, or earth sciences* (Sem: 1-4)
Select 9 credits in any one of the following areas*: arts, humanities, social and behavioral sciences, natural sciences and quantification, and foreign language skills. (If foreign language courses are chosen, it is recommended that these courses be in one foreign language sequence.) (Sem: 1-4)

[1]A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

*Courses that will satisfy the arts, humanities, social and behavioral sciences, natural sciences, and quantification requirements are defined on the Letters, Arts, and Sciences checksheet, which may be obtained from the College of the Liberal Arts associate dean for undergraduate studies at the University Park campus or from any Letters, Arts, and Sciences representative at other locations.

Wildlife Technology

University College: Penn State DuBois
University Park, College of Agricultural Sciences (2 WLT)

PROFESSOR AARON STOTLEMYER, in charge, Penn State DuBois

The Wildlife Technology major helps prepare students in the techniques of wildlife management. Personnel trained in this field are needed to assist in the applied phases of natural resource management, wildlife biology, range management, and the care, maintenance, and propagation of animals. Graduates should be able to support professionals in wildlife biology, park managers, game refuge managers, and laboratory technicians in research. The Wildlife Technology Program is accredited by the North American Wildlife Technology Association (NAWTA).

For the Associate in Science degree in Wildlife Technology, a minimum of 64 credits is required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

GENERAL EDUCATION: 21 credits
(9 of these 21 credits are included in REQUIREMENTS FOR THE MAJOR.)

REQUIREMENTS FOR THE MAJOR: 52 credits
( This includes 9 credits of General Education courses: 3 credits of GN and 6 credits of GWS.)

PRESCRIBED COURSES (45 credits)
BIOL 110 GN(4), FORT 150(3), FORT 160(3), ENGL 202C GWS(3), WILDL 101(3)[1], WILDL 103(4)[1], WILDL 106S(4) (Sem: 1-2)
AG 113(1), CAS 100 GWS(3), FOR 242(3), KINES 013 GHA(1), WILDL 207(3), WILDL 208W(3)[1], WILDL 211(4), WILDL 213(3) (Sem: 3-4)

ADDITIONAL COURSES (7 credits)
Select 3 credits from: ENGL 015 GWS(3) or ENGL 030 GWS (3) (Sem: 1-2)
Select 4 credits from: WILDL 204(4) or STAT 200 GQ(4) (Sem: 3-4)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Workforce Education and Development

University Park, College of Education

MARK THREETON, Assistant Professor
Address: 301C Keller Building
Email: MDT177@psu.edu
Phone: 814 863 5361
This is a 60 credit program, with many of the courses offered in multiple delivery formats to address the needs of the adult learner, such as a blend of face-to-face and online, delivery via video conference technologies such as Polycom or Adobe Connect, or totally online. It will provide a solid foundation of curriculum pertinent to gaining knowledge and skills required for success in the field of workforce education and development. It will allow the participant to develop the skills and competencies essential to analyzing community and/or organizational needs, recommend and deliver effective education and training programs for process and employee improvement, supervise and lead others, and manage workforce development projects and initiatives. It will also provide the opportunity to network with individuals who share many of the same interests and will enhance the participant’s ability to address community and organization needs.

Optional requirements for the major: of the 16 credits of electives, up to 12 credits of occupational experience can be earned.

For a Associate in Science degree in Workforce Education and Development a minimum of 60 credits are required.

Scheduling Recommendation by Semester Standing Given Like (Sem: 1-2)

GENERAL EDUCATION: 21 Credits
(21 credits of these 21 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

FIRST-YEAR SEMINAR:
(Included in Electives)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in Requirements for the Major)

WRITING ACROSS THE CURRICULUM:
(Included in Requirements for the Major)

ELECTIVES: 16 credits

REQUIREMENTS FOR THE MAJOR: (23 Credits)

PRESCRIBED COURSES (23 credits)
WF ED 105(3), WF ED 106(3), WF ED 207W GWS(3), WF ED 310(3), WF ED 411(3), WF ED 450 US;IL(3), WF ED 495D(5) (Sem: 1-4)

Last Revised by the Department: Fall Semester 2013
Blue Sheet Item #: 42-03-037
Review Date: 11/19/2013

Minors

African American Studies Minor (AFAMR)

Contacts: Abington College, Tom Smith, ts8@psu.edu; College of the Liberal Arts, Darryl Thomas, dct10@psu.edu

The Department of African and African American Studies awards a certificate to students who, in addition to meeting the requirements for a major, complete 18 credits in the African American Studies minor. This minor is designed for students interested in African American culture and the educational, social, political, and economic development of people of African descent in the United States. In particular, it provides students with the opportunity to explore the experiences of African Americans using theories and methods originating in the field. Students are made aware of the potential to apply such knowledge to the solution of social, political, and economic problems. The minor also promotes greater understanding of the relationship between African Americans and other ethnic groups.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
AF AM 100 GS;US(3), AF AM/WMNST 101 GH;US(3), AFR 110 GS;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (9 credits)
Select 9 credits; at least 6 credits of AAA S courses must be at the 400 level

Last Revised by the Department: Summer Session 2005
Blue Sheet Item #: 33-01-132
African Studies Minor

*University Park, College of the Liberal Arts (AFRST)*

The minor in African Studies is designed for students interested in exploring the political, historical, socioeconomic, and cultural aspects of Africa. The minor provides students with the opportunity to examine both the totality of Africa and/or specific geographical and cultural regions from several disciplinary perspectives.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (9 credits)

- AFR 110 GS; IL(3), AFR 191 GH; IL(3), AFR 192 GH; IL(3) (Sem: 1-2)

**ADDITIONAL COURSES** (9 credits, 6 of which must be AFR courses at the 400 level)

- AFR 105 GN; IL(3), AFR/WMNST 202 GS; IL(3), AFR 209 GS; IL(3), AFR 403(3), AFR 405(3), CMLIT 003(3), HIST 415(3) (Sem: 1-4)

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-062

Review Date: 01/15/2013

LA

Agribusiness Management Minor

*University Park, College of Agricultural Sciences (AG BM)*

The Agribusiness Management minor is offered for students who wish to add business and management principles to their undergraduate major.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 21 credits

**PRESCRIBED COURSES** (12 credits)[1]

- AG BM 101 GS(3), AG BM 102(3), AG BM 106(3), AG BM 200(3) (Sem: 2-6)

**ADDITIONAL COURSES** (9 credits)[1]

Select 9 credits (6 of which must be from 400-level) from AG 301W(3), AG BM 302(3), AG BM 308W(3), AG BM 320(3), AG BM 338 IL(3), AG BM 407(3), AG BM 408(3), AG BM 420(3), AG BM 440(3), AG BM 460(3), and AG BM 495A(1-3) or AG BM 495B(1-3) (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

AG

Agricultural Communications Minor

*University Park, College of Agricultural Sciences (AGCOM)*

Through the Department of Agricultural Economics, Sociology, and Education, this interdisciplinary program of study is designed to introduce majors in the College of Agricultural Sciences to the skills and professional practices in communications and to the interdependence between communications and society. A grade of C or better is required in every course used to satisfy the requirements for the minor.

Students are required to complete a total of 19 credits, including 6 credits at the 400 level.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*
REQUIREMENTS FOR THE MINOR: 19 credits

PRESCRIBED COURSES (7 credits)
COMM 160(1) (Sem: 1-2)
COMM 260W(3) (Sem: 3-4)
AGCOM 462W(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
Select 3-6 credits from AEE 330W(3), AEE 440(3), or AGCOM 495(1-3) (Sem: 3-8)
Select 3-6 credits from COMM 180 GS(3), COMM 283W(3), COMM 401(3), COMM 403(3), COMM 405(3), COMM 409(3), COMM 411(3), COMM 413W(3), or COMM 460W(3) (Sem: 3-8)
Select 3 credits from COMM 401(3), COMM 403(3), COMM 405(3), COMM 409(3), or COMM 413W(3) (Sem: 5-8)

Last Revised by the Department: Summer Session 2007
Blue Sheet Item #: 35-02-001
Review Date: 03/12/08

AG

Agricultural Systems Management Minor

University Park, College of Agricultural Sciences (A SM)

The Agricultural System Management minor covers the mechanical, structural, natural resource, processing, and electronic technologies applied in agriculture systems. Students who graduate with this minor will have a solid understanding of how physical sciences and biological principles apply to real world problems in food and fiber industries. With industry teams often formed purposefully with many disciplines represented, this background of applied engineering basics and the focus on quantitative analysis has proven helpful to past graduates.

Integration of the applied technologies is addressed using a systems approach in each required course. Technologies addressed by courses in this minor include combustion engines, electric motors, mechanical and hydraulic power transmission systems, mobile equipment functions and operations, sensor and control systems, building structures, ventilation, drying, irrigation, drainage, food processing. The minor is targeted to students who will use these technologies or manage others who are responsible for systems utilizing these technologies. Most courses required for the minor are taught by engineering faculty, and nearly every course has a laboratory period.

Admission to the minor requires introductory calculus (MATH 110 or MATH 140) and introductory physics (PHYS 211 or PHYS 250).

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

ADDITIONAL COURSES (18 credits)
Students must select from the following to account for 18 or more credits: A S M 307(3), A S M 310(3), A S M 320(3), A S M 327(3), A S M 420(3), A S M 424(3), A S M 425(3), BRS 221(3), BRS 422(3), BRS 426(3), BRS 428(3), BRS 429W(3). A total of 3 credits in BRS 495(1-3), BRS 496(1-3) and/or BRS 497(1-3) may also be used.

Last Revised by the Department: Fall Semester 2005
Blue Sheet Item #: 33-04-002
Review Date: 1/18/05
AG

Agronomy Minor

University Park, College of Agricultural Sciences (AGRO)

Agronomy is concerned with the principles and practices of field crop production and the conservation of soils and land resources. Areas of emphasis include crop production and protection, plant breeding, forage management, nutrient management, and soil conservation and fertility. Education in this minor emphasizes the principles of plant and soil management and the basic sciences upon which these principles are grounded. A minor in agronomy can complement several majors, and will enhance career opportunities in farm management and the agricultural industry. Employment possibilities include farm chemical and fertilizer store managers, sales representatives, field and laboratory technicians, crop management consultants, extension agents, soil and water conservationists, and inspectors for various state and federal regulatory agencies.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES: (6 credits)
AGRO 028(3), SOILS 101 GN(3) (Sem: 3-4)

ADDITIONAL COURSES: (6-7 credits)
Animal Science Minor

*University Park, College of Agricultural Sciences (AN SC)*

The Animal Science minor is designed for students who wish to supplement their academic major with studies in animal science. Students are required to complete a minimum of 23 credits, at least 6 of which must be at the 400 level. A grade of C or better must be obtained in each course in order to complete the minor.

The core of prescribed courses develops a foundation in the various basic disciplines of animal science. Additional courses may be selected by the student to emphasize the production/management of beef cattle, companion animals, dairy cattle, horses, poultry, sheep, or swine or to emphasize genetics, nutrition, or physiology.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**REQUIREMENTS FOR THE MINOR:** 23-24 credits

**PRESCRIBED COURSES** (11 credits)[1]
- AN SC 201(4), AN SC 290W(1), AN SC 301(3) (Sem: 3-4)
- CHEM 202(3) (Sem: 3-6)

**ADDITIONAL COURSES** (6-7 credits)[1]
- Select 3 credits from AN SC 207(2) and AN SC 208(1); or AN SC 300 GN(3) (Sem: 3-4)
- Select 3-4 credits from AN SC 305(3), AN SC 306(3), AN SC 308(4), AN SC 309(4), AN SC 310(3), AN SC 311(4), AN SC 327(3), CHEM 210(3) (Sem:3-6)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
- Select 6 credits of 400-level AN SC courses (Sem: 7-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

AG

Anthropology Minor *(ANTH)*

*Contacts: Abington College, Manohar Singh, m.singh@psu.edu; College of the Liberal Arts, Pat Johnson, plj2@psu.edu*

The Anthropology minor is designed to provide undergraduate students with exposure to the range of human variation across time and space. Our minors enroll in courses that explore that variation through the subdisciplines of archaeological, biological, and cultural anthropology. We maintain laboratory facilities in all three subdisciplines and the Matson Museum of Anthropology, all excellent learning facilities for our students. In addition, the department offers summer field school opportunities in cultural anthropology and archaeology. A Minor in Anthropology is excellent preparation for further study in any discipline that requires ability to understand and deal with other cultures, for example, teaching, counseling, business, medicine, law, or communications.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (9 credits)
- ANTH 002 GS(3), ANTH 021 GN(3), ANTH 045 GS;US;IL(3) (Sem: 1-6)

**SUPPORTING COURSES AND RELATED AREAS** (9 credits)
- Select 3 credits from any ANTH course except ANTH 001 GS;US;IL(3) (Sem: 1-8)
- Select 6 credits from the ANTH 400-489 range (Sem: 3-6)

Last Revised by the Department: Fall Semester 2001

Review Date: 4/9/02

LA
Arabic Language Minor

University Park, College of the Liberal Arts (ARAB)

Modern Arabic is a crucially important world language. The minor in Arabic is intended to provide students with a good working knowledge of modern Arabic language, cultures, and societies, in order to broaden students' horizons and sharpen their awareness and abilities in internationalism and globalization. Students undertake three years of language study (or equivalent); education abroad can be included.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (12 credits)
ARAB 001(4), ARAB 002(4), ARAB 003(4) (Sem: 1-4)

ADDITIONAL COURSES* (9 credits)
Select 3 credits from ARAB 110 IL(3), ARAB 197(1-9), ARAB 199 IL(1-12), ARAB 296(1-18), ARAB 297(1-9), ARAB 299 IL(1-12), ARAB 397(1-9), or ARAB 399 IL(1-12) (Sem: 1-8)
Select 6 credits from ARAB 401 IL(3), ARAB 402 IL(3), ARAB 494(1-12), ARAB 496(1-18), ARAB 497(1-9), or ARAB 499 IL(1-12) (Sem: 5-8)

* Because this minor focuses on developing language proficiency in modern Arabic, special topics courses in English or other courses taught in English do not satisfy this requirement.

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-05-115

Review Date: 02/22/2011

Arboriculture Minor

College of Agricultural Sciences (ARBOR)

The Arboriculture minor has been designed to provide students with a comprehensive introduction to the principled and practices of the arboriculture profession. Combined with a major in Horticulture or Forestry, this minor will help prepare students for a career in arboriculture. The courses in the minor include arboriculture, disease and insect control, the planting and maintenance of plants in the landscape, and management of trees in urban environments. HORT 201, and many of the introductory positions available to graduates with an arboriculture minor, require physical strength and conditioning. The profession of arboriculture has many opportunities available in the application of arboricultural practices, sales, consulting, management of companies, and management of urban trees.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 26-28 credits

PRESCRIBED COURSES: (18 credits)
HORT 201(2), HORT/FOR 301(3), SOILS 101 GN(3) (Sem: 3-4)
ENT 313(2), ENT 314(1) (Sem: 5-6)
FOR 401(3), HORT 408(4) (Sem 7-8)

ADDITIONAL COURSES (8-10 credits)
Select 3 credits from FOR 203(3), HORT 137(3) (Sem: 3-4)
Select 2-3 credits from PPEM 300 GN(3) or PPEM 318(2) (Sem: 5-6)
Select 3-4 credits from BIOL 110 GN(4) or BIOL 127 GN(3) (Sem: 5-6)

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

AG

Architectural History Minor

University Park, College of Arts and Architecture (ARC H)

This interdisciplinary minor administered by the Department of Art History is designed for students interested in exploring architectural history from a variety of disciplines.

This minor is open to students in all majors. Majors in Art History, Anthropology, Architecture, Landscape Architecture, Classics and Ancient Mediterranean Studies, and Geography may only double count 6 credits taken in their major field towards this minor. A grade of C or better is required in all course requirements for the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits
PRESCRIBED COURSES (6 credits) (Sem: 1-4)
ART H 201(3), ART H 202(3)

ADDITIONAL COURSES (15 credits)
Select 12 credits from the following (Sem: 1-8):
ANTH 008 GS;IL(3), ANTH 009 GS;IL(3), ANTH 420(3), ANTH 422(3), ANTH 423(3)
ARCH 312(3), ARCH 316(3), ARCH 317(3), ARCH 417(3), ARCH 499C(3), ART H 120 GA;IL(3), ART H/AM ST 307 GA;US(3)
ART H 315 GA;IL(3), ART H 330 GA;IL(3), ART H 401(3), ART H 404(3), ART H 405(3-6), ART H 411(3-9), ART H 412(3), ART
H 415(3), ART H 420(3), ART H 440 IL(3), ART H 456 IL(3), ART H 458 IL(3), ART H 497(1-9) (if topic is architecture)
CAMS 012 GH;IL(3), CAMS 015 GH(3), CAMS 020 GH(3), CAMS 090 GH;IL(3), CAMS 140 GH(3)
FR 137 GH;IL(3), GEOG 120 GS;US;IL(3), GEOG 122 GH;US(3), GEOG 423Y US(3), GEOG 427(3), HIST 456Y IL(3), INART/AM
ST 410(3), INART 415(3), LARCH 361W(3), LARCH 497(1-9) (if topic is history)

Last Revised by the Department: Summer Session 2010
Blue Sheet Item #: 38-05-022
Review Date: 02/23/2010

Architecture Studies Minor

University Park, College of Arts and Architecture (ARCST)
The Architecture Studies Minor will permit students in other majors the opportunity to gain insight into the discipline of Architecture. Students enrolled in the Bachelor of Architecture or Bachelor of Science in Architecture degree programs are not eligible to enter the Minor in Architecture Studies. However, students transferring out of Architecture may opt to receive recognition for their efforts and time spent in the major by completing requirements for the minor. The minor is intended to augment study in allied design majors, but graduates may not pursue licensure to practice Architecture.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits
6 credits must be at the 400-level

ADDITIONAL COURSES: (15 credits)
Architectural History and Theory: (6 credits)
Select 3 credits from ARCH 100 GA(3) or ARCH 210 GA(3) (Sem: 1-2)
Select 3 credits from ARCH 316 GA(3), ART H 201 GA;IL(3), or ART H 202 GA;US;IL(3) (Sem: 1-2)

Cultural Perspectives in Architecture: (3 credits)
Select 3 credits from ARCH 312(3), ARCH 316 GA(3), ARCH 317(3), ARCH 499B IL(3), ART H 120 GA;IL(3), ART H 140
GA;IL(3), ART H 308 GA(3), ART H 315 GA;IL(3), ART H 330 GA;IL(3), ART H 401 IL(3), ART H 405 US;IL(3), ART H 412 IL(3),
ART H 413(3), ART H 415 US(3), ART H 420 IL(3), ART H 440 IL(3), ART H 456 IL(3), ART H 458 IL(3), ART H 460 IL(3), ASIA
315 GA;IL(3), ASIA 440 GA;IL(3), LARCH 065 GA;US;IL(3) (Sem: 3-8)

Architectural Design Applications: (6 credits)
Select 6 credits from ARCH 121(2)[3], ARCH 122(2)[3], ARCH 130A(3 max)[2], ARCH 131S(4)[3], ARCH 132 (4)[3], ARCH
412(3), ARCH 442(3)[2], ARCH 443(3), ARCH 481(3), ARCH 497(1-9), ARCH 499C IL(2-3), ARCH 499D (4)[2] (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS: (6 credits)
Architectural Capstone or Supporting Course: (3 credits)
Select 3 credits within ARCH (ARCH prefix courses excluding ARCH 130A and ARCH 441) (Sem: 5-8)

Architectural Supporting Course: (3 credits)
Select 3 credits in ARCH (ARCH prefix courses excluding ARCH 130A and ARCH 441) or in specific AE or LARCH courses
from an approved department list (Sem: 5-8)

Last Revised by the Department: Summer Session 2014
Blue Sheet Item #: 43-01-019
Review Date: 08/19/2014

Art History Minor

University Park, College of Arts and Architecture (ART H)
The minor in Art History provides students with a broad introduction to the history of art, as well as the opportunity for more specialized study in one or two fields. Specialized study may concentrate upon one region of the world (e.g. India) or
one period (e.g. Renaissance). A student should seek the advice of her/his minor adviser on course selections. The study of art history develops a student's visual acuity by providing a critical understanding of visual culture in a diversity of societies around the world. Students learn to understand art within the contexts of religion, politics, philosophy, culture, technology, society, and gender. A minor in Art History can be of particular interest for students pursuing careers in art, art education, history, anthropology, archaeology, classics, English, foreign language/literature, cultural studies, international business, and arts administration. Students majoring in Art History cannot take this minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES: (6 credits)
ART H 111 GA;IL(3), ART H 112 GA;IL(3) (Sem: 1-4)

ADDITIONAL COURSES: (3 credits)
Select 3 credits from: ART H 120 GA;IL(3), ART H 130 GA;IL(3), ART H 301 GA;IL(3), ART H 315 GA;IL(3), ART H 320 GA;IL(3), ART H 330 GA;IL(3), or ART H 335 GA;IL(3) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS: (12 credits)
Select 6 credits of 001 to 400-level ART H courses, except ART H 100 GA(3) (Sem: 3-8)
Select 6 credits of 400-level ART H courses (Sem: 3-8)

(Note: Students are encouraged to use these supporting courses to focus their studies in one or two areas of art history and should discuss these course selections with an Art History faculty member.)

Last Revised by the Department: Spring Semester 2010
Blue Sheet Item #: 38-05-021
Review Date: 02/23/2010

AAA

Asian Studies Minor

Abington
University Park, College of the Liberal Arts (ASIA)

This is an interdisciplinary minor designed for students with special interests in the Asian area. In addition to the requirements of the student's major department, the minor consists of 21 credits selected from such disciplines as anthropology, art history, economics, geography, history, linguistics, literature, philosophy, political science, religious studies, speech, theatre arts, and appropriate Asian languages.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (3 credits)
ASIA 100 GH;IL(3) (Sem: 1-4)

ADDITIONAL COURSES (3 credits)
HIST 174 GH;IL(3), HIST 175 GH;IL(3), HIST 176 GH;IL(3), or RL ST 003 GH;US;IL(3) (Sem:3-6)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits from a departmental list, at least 6 at the 400 level; independent study credits selected in consultation with adviser; additional further credits in language studies beyond the first semester may be permitted up to 15 credits. (Sem: 1-8)

Courses not on the list that deal substantially with some aspect of Asia in any discipline may also count, pending approval of an adviser. Students seeking to combine an Asian Studies minor with a major in an Asian language (such as CHNS or JAPNS) may include up to 15 credits of language study in a SECOND Asian language, but must have at least 3 courses that do not overlap with their other major(s) or minor(s) in Asian Studies or other Asian languages.

Last Revised by the Department: Summer Session 2014
Blue Sheet Item #: 43-01-066
Review Date: 08/19/2014

LA

Astronomy and Astrophysics Minor

University Park, Eberly College of Science (ASTRO)

The minor in Astronomy and Astrophysics, available at the University Park campus, provides educational options to students with interest in astronomy but with principal commitments to an allied field. It is designed principally for majors
in Aerospace Engineering, Electrical Engineering, Engineering Sciences, Geosciences, Meteorology, and Physics. The educational objectives are to provide students with a profound understanding of the large-scale properties and processes in our Universe including planets and solar systems, our Sun and other stars, our Galaxy and other galaxies; and cosmology. Students in the minor survey the field in the 200-level sequence and then select from a choice of advanced astronomy and allied courses. Minors will be encouraged to take advantage of the many undergraduate research opportunities in the department, often using space-based observatories.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

** REQUIREMENTS FOR THE MINOR: 22-23 credits **

**PRESCRIBED COURSES** (10 credits)
- PHYS 211 GN(4) (Sem: 1-2)
- ASTRO 291 GN(3), ASTRO 292 GN(3) (Sem: 3-4)

**ADDITIONAL COURSES** (6-7 credits)
Select 6-7 credits from additional ASTRO 400-level courses, AERSP 308(3), AERSP 312(3), E E 472(3), GEOSC 474(3), METEO 466(3), or PHYS 458(4) (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
Select 6 credits from 400-level ASTRO courses, except ASTRO 496 (Sem: 5-8)

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

UCA Revision #2: 7/26/07

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**Biochemistry and Molecular Biology Minor**

*University Park, Eberly College of Science (B M B)*

The Biochemistry and Molecular Biology minor provides a foundation in traditional biochemistry and an exploration of the current understanding of molecular biology. The fields of biochemistry and molecular biology are extensively interconnected and are taught in the context of the biology of the cell. Stated another way, the B M B minor is a substantial treatment of life processes at the molecular and cellular levels. The minor requires coursework in general biochemistry, cell biology, and molecular biology. A required laboratory course exposes students to the basic techniques and instrumentation used in modern biochemistry and molecular biology laboratories. Students considering this minor should be comfortable with the study of chemistry.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

** REQUIREMENTS FOR THE MINOR: 33-35 credits **

**PRESCRIBED COURSES:** (29-30 credits)
- CHEM 110 GN(3), CHEM 112 GN(3) (Sem: 1-2)
- B M B 251(3), B M B 252(3), CHEM 210(3), CHEM 212(3) (Sem: 3-4)
- B M B 400(2-3), B M B 401(3), B M B 402(3), B M B 442(3) (Sem: 5-6)

**ADDITIONAL COURSES:** (3 credits)
- BIOL 222(3) or BIOL 322(3) (Sem: 3-4)

**SUPPORTING COURSES AND RELATED AREAS:** (0-3 credits)
Select 0-3 credits of B M B courses at the 400-level (Sem: 7-8)

*Note:* B M B 408(1-2) and B M B 496(1-18) may not be used to fulfill requirements for the minor.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

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**Biological Engineering Minor**

*University Park, College of Agricultural Sciences*

*University Park, College of Engineering (B E)*

This minor provides students with an opportunity to apply engineering principles to agricultural and biological production and processing systems and to the management of our natural resources. Courses may be selected by students to gain a better understanding of soil conservation and water quality, food and biological process engineering, structures and their environments, power and machinery, or microbiological engineering.

A grade of C or better is required for all courses in the minor.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18-19 credits

PRESCRIBED COURSES (3 credits)
B E 300(3) (Sem: 5-6)

ADDITIONAL COURSES (15-16 credits)
Select 6 credits from B E 301(3), B E 302(4), B E 303(3), B E 304(3), B E 305(3), B E 306(3), B E 307(3), B E 308(3) (Sem: 5-8)
Select 9-10 credits from one of the following areas: one course marked with * must be selected (Sem: 5-8)
(a) Power and Machinery Systems: A S M 420(3), A S M 424(3), B E 461(3)*, M E 431(3), M E 480(3)
(b) Biological Systems: B E 468(3)*, CH E 340(3), CH E 436(3), CH E 449(3), E SC 484(3)
(c) Natural Resource Systems: A S M 309(3), B E 467(3)*, B E 477(3), B E 487(3), C E 370(3), C E 371(3), C E 461(3)
(d) Food Process Systems: B E 465(3)*, B E 468(3), CH E 410(3), FD SC 430(3), I E 312(3)
(e) Structural Systems: A E 308(4), B E 462(3)*, C E 340(3), C E 341(3), C E 342(3)

Last Revised by the Department: Fall Semester 2012
Blue Sheet Item #: 41-03-046
Review Date: 11/13/2012
UCA Revision #: 7/26/07
EN

Biology Minor (BIOL)

Contacts: Altoona College, Edward Levri, epl1@psu.edu; Eberly College of Science, Barbara DeHart, bzd2@psu.edu; Penn State Berks, Maureen Dunbar, med18@psu.edu; Penn State York, Dr. Anne Vardo-Zalik, amv12@psu.edu

This minor is designed for students in non-Life Science majors, who desire to obtain an in-depth and well-rounded knowledge of Biology -- the science of life and living organisms. This minor is not intended for "Life Science" oriented majors, including Biological Anthropology, Premedicine, and Science, Life Science option. After taking an introductory survey course which exposes students to the basics of Biology, including the chemistry of life, cell structure, genetics, mechanisms of evolution and evolutionary history of biological diversity, plant and animal form and function, and ecology, students select additional courses based on their biological emphasis to account for a total of 18-20 credits. In conjunction with the student's major, the minor prepares students for entry to graduate school or professional school programs, as well as for technical or research careers with governmental agencies or industry. Majors complemented by this minor would include but not be limited to other life and physical sciences, engineering, and business.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18-20 credits

PRESCRIBED COURSES (4 credits)
BIOL 110 GN(4) (Sem: 5-6)

ADDITIONAL COURSES (7-8 credits)
Select 7-8 credits from BIOL 129 GN(4), BIOL 141 GN(3), BIOL 142(1), BIOL 222(3), BIOL 220W GN(4), BIOL 230W GN(4), BIOL 240W GN(4), BIOL 322(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6-9 credits)
Select 6-9 credits from 400-level Biology courses (BIOL 400, BIOL 496, and SC 495 credits may not be used to fulfill this requirement.) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2007
Blue Sheet Item #: 35-06-521
Review Date: 4/10/07

Biomedical Engineering Minor

University Park, College of Engineering (BME)

This interdisciplinary minor is designed for students interested in the application of engineering principles to medical and biological problems. The minor is particularly suitable for students pursuing an undergraduate degree in a different engineering major, physics, or other applied science who are seeking careers in health-related professions. PHYS 211 GN(4), PHYS 212 GN(4), and calculus through differential equations (MATH 250 or 251) are required for entrance to the minor. Additional prerequisites for prescribed and supporting courses may be required and should be researched prior to applying for the minor (e.g. CHEM 112 GN(3) and CMPSC 200 GQ(3)). Students interested in pursuing this minor should contact the Department of Biomedical Engineering with any questions or for more information.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)
REQUIREMENTS FOR THE MINOR: 18-20 credits

ADDITIONAL COURSES (6-8 credits)
Select 3-4 credits of physiology from BIOL 141 GN(3), BIOL 240W GN(4) or BIOL 472(3) (Sem: 3-6)
Select 3-4 credits of molecular/cell biology from BMB 251(3), BME 201(3), or BIOL 230W GN(4) (Sem: 4-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 9-12 credits of Biomedical Engineering (BME) coursework from 3-credit courses at the 400, or 500 level 300-level courses will be considered by petition and only 3 credits of research or independent study credit (BME 494H or 496) may be used. (Sem: 5-8)
Select 0-3 credits of electives from Biomedical Engineering-related courses (department list) (Sem: 5-8)

Black Diaspora Studies Minor

University Park, College of the Liberal Arts (BLDSP)
The minor in Black Diaspora Studies is designed to broaden the perspectives of students through an examination of the international/transnational dimensions of the experiences of African and African-descent populations, particularly those in the Western Hemisphere. Since the early sixteenth century, when Europe, the Americas, and Africa were brought into a pattern of sustained interaction following the onset of the Age of European Discovery, the African slave trade and other forms of migration and exchange have been critical to the formative experience of Africans and African-descent populations linked by the Atlantic. The intensity and impact of those exchanges have varied over time, but the presence of Africans and African-descent populations in the evolution of Atlantic civilization constitutes the core of the study of the African Diaspora.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

A. PRESCRIBED COURSES (9 credits)
AAA S 110 GS;IL(3), AAA S/HIST 211 GH;US;IL(3), AF AM 100 GS;US(3) (Sem: 1-4)

B. ADDITIONAL REQUIREMENTS (9 credits, 6 of which must be at the 400 level)
AAA S/SPAN 132 IL(3), AAA S/HIST 191 GH;IL(3), AAA S/HIST 250 GH;IL(3) (Sem: 1-4)
AAA S/HIST 431 US;IL(3), AAA S/HIST 432 IL(3), AFR 440 US;IL(3), PL SC 453 IL(3) (Sem: 5-8)

Business and the Liberal Arts Minor (BUSLA)

Contact: College of the Liberal Arts, Michael Berkman, mbb1@psu.edu
This minor offers fundamental courses in business, the opportunity for more advanced business courses, and Liberal Arts coursework emphasizing various perspectives on business.

Only courses in which the student earns a grade of C or better may be counted toward fulfillment of the requirements for the minor.

Students pursuing the Minor in Business and the Liberal Arts are encouraged to use ENGL 202D to satisfy their English 202 requirement.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 24-25 credits

PRESCRIBED COURSES (4 credits)
ACCTG 211(4) (Sem: 3-8)

ADDITIONAL COURSES (20-21 credits)
At least 6 credits in additional courses must be at the 400 level.
ECON 102 GS(3) or ECON 014 GS(3) (Sem: 3-8)
FIN 100(3) or FIN 301(3) (Sem: 3-8)
Select 2-3 credits from PHIL 119 GH(3) or B E 392 GWS(2); COMM 427(3), COMM 475(3), COMM 487(3), ENGR 407(3), RPTM 230(3) (Sem: 3-8)

Select 6 credits from the following course list: B A 250(3), B A 321(1-3), COMM 424(3), COMM 473(3), COMM 493(3), ECON 390(3), ECON 490(3), LER 100 GS(3); MGMT 100(3) or MGMT 301(3); MGMT 425(3), MGMT 426(3); MKTG 221(3) or MKTG 301(3), MKTG 302(3), MKTG 310(3), MKTG 327(3), MKTG 330(3), MKTG 342(3), SCM 301(3), STAT 220(3), or 3 credits of appropriate internship selected in consultation with adviser.


Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-04-038
Review Date: 01/10/2012
UCA Revision #1: 8/3/06
UCA Revision #2: 7/26/07

Chemistry Minor

Penn State Berks, Ivan Shibley, ias1@psu.edu
University Park, Eberly College of Science (CHEM)

Contact: Altoona College - Richard Bell, rcb155@psu.edu; Penn State Erie, The Behrend College - Tracy Halmi, tao104@psu.edu; Eberly College of Science - Mark Maroncelli, mxm11@psu.edu

The minor in Chemistry complements degrees in other areas of physical and biological science and introduces students to fundamental principles of chemistry through lecture and laboratory course work.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 26-28 credits

PRESCRIBED COURSES: (16 credits)
CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), CHEM 212(3), CHEM 213(2) (Sem: 1-4)

ADDITIONAL COURSES: (10-12 credits)
Select 4 credits from CHEM 221(4) or 6 credits from CHEM 450(3) or CHEM 466(3) and CHEM 452(3)(Sem: 3-8)
Select 6 credits from 400-level CHEM not used above and excluding CHEM 494(1-10), CHEM 494H(1-10), CHEM 495(1-18), and CHEM 496(1-18) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-04-102
Review Date: 01/13/2015
UCA Revision #1: 9/20/06
SC

Chinese Language Minor

University Park, College of the Liberal Arts (CHNS)

The Chinese Language minor is intended to provide students with a good working knowledge of the Chinese language, taught in a context that emphasizes the characteristics and diversity of Chinese culture and society. Students undertake three years of language study (or equivalent); education abroad can be included.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)
REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES: (8 credits)
CHNS 002(4), CHNS 003(4) (Sem: 1-4)

ADDITIONAL COURSES: (10 credits)
Select 4 credits from CHNS 110 IL(4) or CHNS 296(1-18), CHNS 297(1-9), CHNS 299 IL(1-12) (Sem: 1-8)
Select 6-8 credits from CHNS 401 IL(4), CHNS 402 IL(4), CHNS 403W(4), CHNS 404(4), CHNS 410 IL(3), CHNS 411 IL(3),
CHNS 421 IL(3), CHNS 422 IL(3), CHNS 423 IL(3), CHNS 424(3), CHNS 426 IL(3), CHNS 452(3), CHNS 453 IL(3), CHNS 454
IL(3), CHNS 455 IL(3), CHNS 496(1-18), CHNS 497(1-9) or CHNS 499 IL(1-12) (Sem: 5-8)

Last Revised by the Department: Summer Session 2014

Blue Sheet Item #: 43-01-067
Review Date: 08/19/2014

LA

Classics and Ancient Mediterranean Studies Minor

University Park, College of the Liberal Arts (CAMS)

The CAMS minor recognizes the completion of a broadly interdisciplinary study of the cultures of the ancient Mediterranean world through 18 credits of course work, including 6 credits at the 400-level. The courses offered are concerned with the cultures of the ancient Near East, Egypt, and Mesopotamia, Greece, and Rome in such fields as civilization, archaeology, history, philosophy, religion, and mythologies. Students who complete the Penn State Athens Education Abroad Program and its prerequisite course may apply to receive the minor. Students in the minor may also receive credit for participating in approved archaeological fieldwork in the Mediterranean region. While the study of language is not required, students are encouraged to study the appropriate ancient languages. The minor is especially suitable for students in such fields as history, medieval studies, anthropology, literature, philosophy, and education.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS: (18 credits)
Select 12 credits from CAMS courses (Sem: 1-8)
Select 6 credits of 400-level CAMS courses (Sem: 5-8)

Last Revised by the Department: Summer Session 2001

Blue Sheet Item #: 29-05-036
Review Date: 11/01

LA

Climatology Minor

University Park, College of Earth and Mineral Sciences (CLIMA)

Climate is a central component of the physical environment, playing an important role in a wide range of human activities. The ability to force changes in the global climate system may be one of the more significant ways in which human society will impact Earth's physical environment in the near future. The climatology minor in the College of Earth and Mineral Sciences is an interdisciplinary program drawing from the fields of meteorology, geography, and geosciences. The minor provides an overview of the physical processes that control present-day climate. It also provides an introduction to the history of climate change through geologic time, and presents some of the causes and consequences of potential future climate change and variability.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

ADDITIONAL COURSES (18 credits)
Select 18 credits from:
EARTH 103 GN(3) (Sem: 1-8)
GEOG 438W(3), GEOG 412W(3), GEOG 310W(3), GEOG 417(3), GEOSC 320(3), METEO 300(3) (Sem: 5-8)

Last Revised by the Department: Summer Session 2000

Blue Sheet Item #: 28-05-015
Review Date: 8/5/03

EM
Communication Arts and Sciences Minor (CAS)

Contact: College of the Liberal Arts, Peter Miraldi, pnm10@psu.edu; Penn State York, Dr. Deborah Eicher-Catt, dle4@psu.edu

This minor provides understanding and practice in the ways humans achieve their personal and career goals by means of communication. Students may choose any of the department's pathways of specialization, such as Interpersonal, Family, Intercultural, Organizational, Legal, Political Communication and Presentation Skills, Communication and Technology, or Rhetoric. For example, Legal Communication focuses on communication within the legal system, and provides students with the theory and skills to understand the uses, evaluation, and structure of public policy and legal disputes. Students learn how perception, meaning, and conflict function in human communication if they choose to specialize in Interpersonal Communication, while Organizational Communication critically examines leadership, decision-making, interviewing, and teamwork in formal organizations. In coordination with an adviser, a student of any major may tailor this minor to complement his or her educational and career goals by pursuing a particular pathway.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

ADDITIONAL COURSES (6 credits)
Select 3 credits from CAS 203(3), CAS 205(3), CAS 211(3), CAS 213(3), CAS 214W(3), CAS 215(3), CAS 250(3), CAS 252(3), CAS 271 US;IL(3), CAS 280W(3), or CAS 283(3) (Sem: 3-6)
Select 3 credits from CAS 200(3), CAS 201 GH(3), or CAS 202(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 6 credits of Communication Arts and Sciences courses (Sem: 1-8)
Select 6 credits of Communication Arts and Sciences courses at the 400 level (Sem: 1-8)
Note: CAS 100 GWS(3), CAS 126(3), or CAS 195(1) may not be counted as part of the minor.

Last Revised by the Department: Fall Semester 2002
Blue Sheet Item #: 30-07-104
Review Date: 2/25/05
LA

Dance Minor

University Park, College of Arts and Architecture (DANCE)

This minor is a rigorous program designed to help students who wish to further their skills in this art form. This modern-based program focuses on technique, choreography, and performance. Students choose from a variety of options to create their own dance minor that will give them the tools and the knowledge to further their individual interest in the field. Students have the opportunity to perform in pieces created by faculty, be a member of the University Dance Company, create their own pieces for performance, and attend national conferences. Upon completion of this minor, the student will be able to pick from a variety of career opportunities such as performance, teaching, choreography, production, and studio or have it apply to their major. Twenty-one credits are required for completion of the dance minor with a minimum of 6 credits at the 400 level.

Entrance into the Dance minor will be based on an audition. The audition will consist of a Ballet Barre, Jazz combo, and Modern combo. Ability to pick up and execute technique and combinations is essential. A grade of C or better is required in all courses required in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (5 credits)
DANCE 301(2) (Sem: 2-8)
DANCE 484 US;IL(3) (Sem: 3-8)

ADDITIONAL COURSES (13 credits)
Select 3 credits from DANCE 261(1.5), DANCE 262(1.5), DANCE 361 GA(1.5), DANCE 362(1.5), DANCE 461(1.5), DANCE 462(1.5) (Sem: 1-8)
(These courses may not double count for other dance minor requirements.)
Select 6 credits from the following courses (3 credits at the 400-level):
DANCE 231(1.5), DANCE 232(1.5), DANCE 241(1.5), DANCE 242(1.5) (Sem: 1-4)
DANCE 251(1.5), DANCE 252(1.5), DANCE 261(1.5), DANCE 262(1.5), DANCE 361 GA(1.5), DANCE 362(1.5) (Sem: 1-4)
DANCE 431(1.5), DANCE 432(1.5), DANCE 441(1.5), DANCE 442(1.5), DANCE 451(1.5), DANCE 452(1.5), DANCE 461(1.5), DANCE 462(1.5) (Sem: 5-8)
(All dance minors are required to demonstrate proficiency at beginning level technique courses before selecting the advanced level courses.)
Select 4 credits from:
DANCE 381(2) (Sem: 3-8)
DANCE 480(2) (Sem: 5-8)
Deafness and Hearing Studies Minor

University Park, College of Health and Human Development (DHS)

Contact: Carol A. Miller, cam47@psu.edu; Joel Waters, jrw5090@psu.edu

This interdisciplinary minor is designed for students who want to learn about individuals with hearing disabilities, audition, and deafness within an individual and societal context. Core courses include knowledge and skills in preventing hearing loss, basic communication skills and disabilities, history, thought and culture of individuals who are deaf, and principles of human behavior and their applications. The minor will assist students in recognizing relationships among hearing disability, deafness, cultural differences and their impact on the individual in educational, social and vocational settings. Specializations include, but are not limited to, health-related fields, communications, societal and social life, cultural impact, educational experiences, prejudice and discrimination, and rehabilitation. Students will be able to place deaf culture and hearing disabilities in the proper perspective necessary for life-long learners engaged in fostering climates which embrace individuals from diverse backgrounds, especially disabilities.

The minor is most appropriate for students interested in clinical and health-related fields (e.g., nursing, biobehavioral health, or medicine), professional fields (e.g., business, pre-law, or communications), social sciences (e.g., human development and family studies, sociology, or psychology), and education (e.g., early childhood education, special education, rehabilitation counseling), as it will provide students with exposure to the range of variation in persons with hearing disabilities and deafness across the lifespan.

Students from any major (except Communication Sciences and Disorders) can declare a minor in Deafness and Hearing Studies. A grade of C or better is required for all courses in the minor. Students seeking advising for this minor should contact the Department of Communication Sciences and Disorders.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
CSD 146 US;IL(3), CSD 269 US;IL(3), PSYCH 100 GS(3) (Sem: 1-6)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
(At least 6 credits must be at the 400 level.)

Lasted Revised by the Department: Summer Session 2014

Blue Sheet Item #: 43-01-047

Review Date: 08/19/2014

UCA Revision #1: 8/20/06

HH

Dispute Management and Resolution Minor

University Park, College of the Liberal Arts (D M R)

This interdisciplinary minor, administered by the Departments of Communication Arts and Sciences, and Labor Studies and Employment Relations, provides students with the opportunity to learn about and develop skills appropriate to the management and resolution of problems created by difference in attitudes, beliefs, values, and behavioral preferences of individuals primarily in interpersonal, group, and organizational contexts, and, to a lesser extent, international contexts.
The minor is supportive of, and complementary to, work emphasizing conflict and means for dealing with it in such majors as Administration of Justice, Communication Arts and Sciences, Human Development and Family Studies, Labor and Employment Relations, Political Science, Psychology, and Sociology. Students pursuing the minor must complete 9 credits of prescribed course work and 9 credits of additional course work distributed across at least two of the eight areas identified below. Of the 18 credits selected, at least 9 must be at the 400 level, 6 must be from Communication Arts and Sciences, and 6 must be from Labor and Employment Relations. A maximum of 6 credits earned in the minor, if appropriate, can be used to satisfy requirements in the Communication Arts and Sciences or Labor and Employment Relations majors. Only courses in which the student earns a grade of C or better may be counted toward fulfillment of requirements for the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
CAS 203(3), LER 100 GS(3) (Sem: 3-6)

ADDITIONAL COURSES (12 credits)
(Select 12 credits of which 9 credits must be taken at the 400 level)
Select 3 credits from LER 404(3) or CAS 404(3) (Sem: 5-8)

Last Revised by the Department: Spring Semester 2000
Blue Sheet Item #: 27-07-064
Review Date: 11/4/03
UCA Revision #: 8/3/06

Earth Systems Minor

University Park, College of Earth and Mineral Sciences (EASY)

The recognition that environmental problems are global in extent, and impact on many different components of the Earth System simultaneously, requires that we adopt a large-scale and interdisciplinary approach to questions of global change and the interactions of the physical and human environments. The Earth Systems minor follows such an approach and offers undergraduates the opportunity to study the Earth as an integrated system. The Earth Systems minor is a science minor offered through the College of Earth and Mineral Sciences. It provides a wider interdisciplinary perspective for majors in the traditional Earth Science disciplines (geography, geoscience, and meteorology), and provides an introduction to Earth Sciences and a broad exposure to Earth Systems/Environmental Studies for other science and engineering majors. Students may apply up to 6 credits from courses in the major department to satisfy the minor requirements. A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENT FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
EARTH 002 GN(3) (Sem: 3-6)

ADDITIONAL COURSES (6 credits)
Select 6 credits from EARTH 103 GN(3), EM SC 470W(1-6), GEOG 430(3), GEOSC 310(4), or METEO 300(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits from the Earth Systems Committee's approved list of courses (Sem: 5-8)

Last Revised by the Department: Spring Semester 2000
Blue Sheet Item #: 28-05-018
Review Date: 2/15/00

Economics Minor

University Park, College of the Liberal Arts (ECON)
World Campus

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
PRESCRIBED COURSES (12 credits)
ECON 102 GS(3), ECON 104 GS(3) (Sem: 3-4)
ECON 302 GS(3), ECON 304 GS(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits of additional ECON courses at the 400-level (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001
Review Date: 9/2/03
LA

Education Policy Studies Minor

University Park, College of Education (E P S)

This minor is designed to introduce students to the fundamental tenets of education policy development and analysis in both the U.S. and other countries. Students pursuing the minor may choose from courses on educational policy in the areas of higher education, educational administration, educational theory and policy, Native American education leadership and comparative/international education. The minor consists of a multidisciplinary program of study in areas of education related to numerous policy issues including social sciences, history, management sciences, and/or humanities. It is anticipated that students completing the minor will find these studies can enrich any major degree program and potentially provide opportunities for employment and/or graduate studies in state departments of education, ministries of education, federal and international education agencies, academic institutions, and various professional associations.

This 18-credit minor may be combined with any undergraduate major at Penn State.

A grade of C or better is required for all courses taken in fulfillment of the minor. No prerequisites are required for the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
EDTHP 115 US(3), EDPSY 014(3) (Sem: 1-4)

ADDITIONAL COURSES (12 credits)

Last Revised by the Department: Summer Session 2006
Blue Sheet Item #: 34-06-261
Review Date: 4/11/06
ED

Electrochemical Engineering Minor

University Park, College of Earth and Mineral Sciences (ELCHE)

The electrochemical engineering minor is designed to equip students with the knowledge necessary to achieve the following educational objectives: become valuable contributors in addressing society's clean energy needs and demands especially in the electrochemical power generation sector; and educators, practicing engineers, and national leaders in electrochemical energy conversion and storage. The minor integrates skill sets in fundamentals of electrochemistry (e.g. chemistry, physics, mathematics, thermodynamics, and chemical kinetics) and electrochemical engineering applications (batteries, solar, flow and fuel cells, electrochemical synthesis and corrosion) to ensure successful career opportunities and growth within electrochemical power generation industries, government agencies, and academia. The curriculum should allow students in energy related programs such as chemical, civil, electrical, environmental, mechanical, and materials science and engineering to readily take advantage of the minor and be better prepared for careers in clean power generation and future green technologies.

The integration of knowledge and skills acquired through the inquiry-based teaching methods should enable students of the program to achieve the following student educational outcomes:

- solve problems relating to the production, storage, distribution and utilization of electrochemical energy and the associated environmental issues
- design and conduct experiments, acquire data, define, analyze, and interpret data, and solve practical, complex problems on a variety of electrochemical technologies such as batteries, solar cells, flow and fuel cells, electrolyzers, and supercapacitors
- integrate professional, ethical, social and environmental factors in electrochemical engineering design and problem solving and understand the impact of these factors on global energy issues
- develop the ability to communicate effectively in writing and orally and build teamwork
Electronic and Photonic Materials Minor

Electronic and photonic materials have greatly changed modern life. Without them, computers, telecommunication systems, compact disc players, video cameras, and all the electronics with which we have become accustomed would not be possible. The study of electronic and photonic materials is a natural bridge between the fields of electrical engineering and material science. Students in electrical engineering will benefit from this minor because they will better understand the materials with which they will design electronic and photonic devices, such as transistors on a computer chip or semiconductor lasers in a compact disc player. Training in the field of electronic and photonic materials requires study of the processing and characterization of these materials to help engineers develop ways to lower cost and improve performance. This knowledge will help prepare students to enter the semiconductor industry or pursue graduate studies.

A grade of C or better is required for all courses in the minor.

For a MINOR in Electronic and Photonic Materials a minimum of 35 credits are required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 35 credits

PRESCRIBED COURSES (23 credits)
E E 310(4), MATH 140(4), MATH 141(4), MATH 231(2), MATSE 201(3) (Sem: 1-4)
CHEM 112 GN(3), E E 441(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
Select 3 credits from E SC 314(3) or an approved E E course (Sem: 1-4)
Select 3 credits from MATSE 450(3) or MATSE 455(3) (Sem: 5-8)

Last Revised by the Department: Fall 2015

Blue Sheet Item #: 44-03-029

Review Date: 11/17/15

UCA Revision #: 7/27/07

Energy Business and Finance Minor

The minor in Energy, Business and Finance is an offering of the College of Earth and Mineral Sciences. The minor introduces students to financial, investment, and management concepts applied to private sector organizations whose operation emphasizes the Earth and its environment, the energy and mineral industries, or the development of new and enhanced materials. The minor focuses on the leadership and information strategies characteristic of enterprises that are succeeding in a rapidly integrating global economy.

The minor provides science and engineering students an introduction to basic entrepreneurial and business concepts to help prepare them for success in a changing professional environment. It also provides other Penn State students an opportunity to focus on business strategies in the Earth resources, environmental, and materials industries. A minimum of 24 credits is required for the minor. A student enrolled in this minor must receive a grade C or better in all courses in the minor. Advising is available through the EMS Student Center (014 Deike Building) or the professor in charge.

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 24 credits

PRESCRIBED COURSES (12 credits)
E E 310(4), MATH 140(4), MATH 141(4), MATH 231(2), MATSE 201(3), CHEM 112 GN(3), E E 441(3) (Sem: 1-4)

ADDITIONAL COURSES (12 credits)
Select 6 credits from E SC 314(3) or an approved E E course (Sem: 1-4)
Select 6 credits from MATSE 450(3), MATSE 455(3) (Sem: 5-8)

Last Revised by the Department: Fall 2015

Blue Sheet Item #: 44-03-029

Review Date: 11/17/15

UCA Revision #: 7/27/07

EM
Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 24 credits

PRESCRIBED COURSES (15 credits)
- ECON 102 GS(3), MATH 022 GQ(3) (Sem: 1-2)
- E B F 200 GS(3) (Sem: 3-4)
- E B F 301(3), EME 460(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)
- ECON 101 GN(3) or ECON 102 GN(3) or ECON 120 GS;US;IL(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
- Select 6 credits from the approved list of EMS courses. Approved courses are: E B F 401(3), E B F 473(3), E B F 484(3), EGE 401(3), EME 444(3), GEOG 424 US;IL(3), GEOG 430(3), GEOG 431(3), GEOG/EME 432(3), GEOG 444(3), GEOG 469(3), GEOSC 402Y IL(3), GEOSC 454(3), and METEO 473(3) (Sem: 7-8).

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-058
Review Date: 8/25/2015

EM/BA

Energy Engineering Minor

University Park, College of Earth and Mineral Sciences (ENENG)

Professor Sarma Pisupati, Program Officer

The minor in Energy Engineering is designed to provide students in engineering, science, and energy business and finance (EBF) with additional courses, exposure, and experiences to the principles and applications of energy engineering. Courses available to students include thermal sciences; petroleum and natural gas processing; renewable/sustainable energy; chemistry of fuels; electrochemical, chemical and nuclear energy conversion processes; physical processes in energy engineering; air pollution; and green engineering and environmental compliance. As a result, the selection of this minor can provide additional career options for students in a wide range of offerings at Penn State.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

ADDITIONAL COURSES (18 credits)
- Select 9 credits from the following courses: EGE 302(3), EGE 304(3), EGE 411(3), EGE 420(3), EGE 430(3), EME 301(3) (Sem: 5-6)
- Select 9 credits from the following courses: EGE 433(3), EGE 437(3), EGE 438(3), EGE 441(3), EGE 451(3), EGE 464W(3), EGE 470(3), F SC 431(3), F SC 432(3) (Sem: 7-8)

Last Revised by the Department: Fall Semester 2007
Blue Sheet Item #: 35-05-074
Review Date: 3/4/09

EM

Engineering Leadership Development Minor

University Park, College of Engineering (E LD)

This interdisciplinary minor is designed to provide engineering students with critical principles and skills. Engineering graduates must demonstrate the ability to assume leadership roles in a competitive technologically complex global society. There are increasing demands for engineers to be able to deal effectively with other people, including the ability to work in teams and to interact with customers and other organizations on both national and international levels. Students will employ engineering case studies in active and collaborative classroom settings to develop these skills. The minor consists of 18 semester hours. A grade of C or better is required in all minor courses. Students in all engineering majors are eligible. For admission to the minor, students must have completed ENGR 408(2). Students should apply during their sophomore year.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
- ENGR 409(3) (Sem: 5-6)
- ENGR 408(2) (Sem: 5-8)
- ENGR 493(1), S T S 460(3) (Sem: 7-8)

ADDITIONAL COURSE (3 credits)
- B A 250(3) or ENGR 407(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with the coordinator of the Engineering Leadership Development Minor (Sem: 5-8)

Last Revised by the Department: Spring Semester 2002
Blue Sheet Item #: 30-03-100C
Review Date: 11/20/01
EN

Engineering Mechanics Minor

University Park, College of Engineering (E MCH)

The Engineering Mechanics minor helps students prepare to analyze and/or design simple structures that are efficient and safe under foreseen loading conditions. Contemporary engineering design of mechanical components requires precise information and modern analysis techniques to determine material response to anticipated loading. Designers must have the analytical and experimental tools to accurately define deformation under load to characterize dynamic response and to prevent mechanical failure. In the event of failure the cause(s) must be ascertained to prevent future failure through redesign and/or material substitution. Thus, industry has a real need for those with a sound foundation in Engineering Mechanics, the engineering science that deals with the effects of forces and torques on rigid and deformable bodies. Engineering Mechanics consists of Statics (bodies in equilibrium), Dynamics (bodies in unsteady motion such as vibration, moving on curvilinear paths) and the Mechanics of Deformable Media. The latter topic covers the change in dimensions of bodies of various shapes under the influence of forces, torques, temperature, and dynamic motion. Further failure criteria under such loadings are introduced and utilized in examples of engineering design. Some twenty undergraduate courses covering the above topics are available at two levels, i.e. sophomore introductory and senior (400) courses.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS: (18 credits)
Select 12 credits of E MCH courses, which may include: E MCH 211(3), E MCH 212(3), E MCH 213(3), E MCH 315(2), E MCH 316(1) (Sem: 1-4)
Select 6 credits from 400-level E MCH courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001
Review Date: 8/29/02
EN

English Minor (ENGL)

University Park, College of the Liberal Arts (ENGL)

Contact: Abington College, Tom Smith, trs8@psu.edu; Altoona College, Erin Murphy, ecm14@psu.edu; Penn State Brandywine, Adam Sorkin, as2@psu.edu; Penn State Fayette, Danielle Mitchell, dmm52@psu.edu; Penn State Greater Allegheny, Mildred Mickle, mrm33@psu.edu; Penn State Mont Alto, Kevin Boon, kab25@psu.edu; Penn State Wilkes-Barre, Steven Putzel, sdp4@psu.edu; College of the Liberal Arts, Elizabeth Brown, eaf4@psu.edu; Penn State York, Dr. Jennifer Nesbitt, jpn12@psu.edu

A grade of C or better is required for all courses in the minor.

For the minor in English a minimum of 18 credits are required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS: (18 credits)
Students may not count courses used to satisfy General Education Writing/Speaking Skills
Select 6 credits from ENGL 200-299 (Sem: 3-8)
Select 6 credits from ENGL 400-499 (Sem: 3-8)
Select 6 additional credits in English (Sem: 3-8)

Last Revised by the Department: Fall Semester 2015
Blue Sheet # 44-03-073
Review Date: 11/17/15
Entomology Minor

*College of Agriculture Sciences (ENT)*

Through the Department of Entomology, the minor in Entomology is primarily designed for (but not restricted to) students in the Agroecology major seeking additional studies in the entomological sciences. Successful completion of this minor area of study will help prepare students for graduate studies in entomology and related fields.

A minor in Entomology requires 22 credits in approved courses in addition to the major requirements of the student's choice. Appropriate course substitutions may be considered with minor adviser approval.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem:1-2)*

**REQUIREMENTS FOR THE MINOR:** 22 credits

**PRESCRIBED COURSES** (9 credits)[1]
- BIOL 110 GN(4)[18], ENT 313(2), ENT 457(3) (Sem: 2-4)

**ADDITIONAL COURSES** (13 credits)[1]
- Select 1 credit from ENT 314(1) or ENT 316(1) (Sem: 2-4)
- Select 3 credits from AGECO 201(3), BIOL 222(3), BIOL 427(3), PPEM 405(3) (Sem: 3-8)
- Select 6 credits from ENT/VB SC 402W(3), ENT 410(3), ENT 420(3), ENT 424(3), ENT 425(3), ENT 432(4), ENT 445(3) (Sem: 4-8)
- Select 3 credits of ENT 496(1-18) (Sem: 4-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

[18] A grade of C or better per course is required for teacher certification.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

AG

Environmental and Renewable Resource Economics Minor

*University Park, College of Agricultural Sciences (E RRE)*

This minor introduces students to how fundamental economic principles can be used to explain and seek solutions for problems related to the degradation of the environment and unsustainable use of natural resources. This program complements majors that provide a natural science-based approach to environmental issues and provides social-science majors interested in the environment with additional tools for the analysis of social decision-making, and policy objectives. A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (9 credits)
- CED 201(3), CED 429(3), ECON 302 GS(3) (Sem: 5-6)

**ADDITIONAL COURSES** (9 credits)
- Select 9 credits from CED 431W(3), ECON 428(3), CED 450 IL(3), E R M 411 (3), R SOC 327(3), 300- or 400-level internship or independent study (3 credit max.) (Sem: 5-8)

Last Revised by the Department: Summer Session 2004

Blue Sheet Item #: 30-04-001

Review Date: 01/15/02

AG

Environmental Engineering Minor

*University Park, College of Engineering (ENV E)*

This minor is designed to provide students in engineering, science, and other majors with a comprehensive study of environmental issues and the skills necessary to solve problems associated with environmental pollution.

For entrance into the minor, students must be at least fifth-semester standing and have completed CHEM 110 GN(3), MATH 141 GQ(4), and PHYS 211 GN(4).

The minor consists of 18 credits, at least 6 of which must be at the 400 level. A grade of C or better is required for all courses in the minor.

An online application is available at: [http://www.engr.psu.edu/CE/env_minor.html](http://www.engr.psu.edu/CE/env_minor.html).

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*
Environmental Resource Management Minor

University Park, College of Agricultural Sciences (E R M)

The Environmental Resource Management (E R M) minor is designed to provide science-based non-majors with a cohesive selection of courses related to the sustainable management of environmental resources.

The minor was developed to permit students from other majors to have their environmental interests and training formally documented on their academic records. Because so many of society’s activities have an impact on environmental quality, the minor should appeal to students with majors from a wide variety of science-based disciplines.

The E R M minor includes an introduction to calculations and problem-solving skills common to managing environmental resources, and allows students to select a wide variety of other E R M courses that cater to their strengths and interests. Individual programs are determined jointly by the student and the E R M Program Coordinator.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

ADDITIONAL COURSES (18 credits)

Select 18 credits from A S M 327(3), SOILS 101 GN(3), or any E R M course. At least 6 credits must be at the 400-level (Sem: 3-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

AG

Environmental Soil Science Minor

University Park, College of Agricultural Sciences (ESOIL)

The Environmental Soil Science minor enables students to acquire scientific and field-related skills in preparation for environmental careers. Students learn to understand and apply soils and land use information in a wide variety of professional settings. The Environmental Soil Science minor will prepare students for jobs as professional soil scientists or for graduate studies in Soil Science and other interdisciplinary environmental sciences.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18-19 credits

PRESCRIBED COURSES (6 credits)

SOILS 101 GN(3), SOILS 102(1), SOILS 403(2) (Sem: 1-5)

ADDITIONAL COURSES (12-13 credits)

Select 12-13 credits from SOILS courses, or A S M 327(3), C E 335(3), E R M 433(3), E R M 440(3), FOR 475(3), TURF
Environmental Systems Engineering Minor

*University Park, College of Earth and Mineral Sciences (ENVSE)*

**PROFESSOR M. THADDEUS ITYOKUMBUL, Program Officer**

The minor in environmental systems engineering is for students interested in environmental issues associated with the extraction, processing and utilization of mineral and energy resources and their solutions. It provides an opportunity for students to understand and appreciate the interrelationship between energy and the environment, be exposed to the basic courses in environmental systems engineering, and to appreciate and evaluate the impact of environmental pollution control on viability of the profitability and feasibility of operations associated with the safe extraction, processing and utilization of mineral and energy resources. A minimum of 18 credits is required for the minor. A student enrolled in this minor must receive a grade C or better in all courses in the minor. Advising is available through the professor in charge.

*Scheduling Recommendations by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (15 credits)

- EME 460(3), ENVSE 406(3), ENVSE 427(3), ENVSE 450(3), MN PR 301(3) (Sem: 5-7)

**ADDITIONAL COURSES** (3 credits)

- EGEE 470(3), ENVSE 400(3), or MN PR 426(3) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2010

Blue Sheet Item #: 39-02-012

Review Date: 09/28/2010

Equine Science Minor

*University Park, College of Agricultural Sciences (EQ SC)*

The Equine Science minor is designed for students who wish to supplement their academic major with studies in equine science. Students are required to complete a minimum of 20 credits. The core prescribed courses develop a foundation in the basic disciplines of animal science and equine science. Additional courses may be selected by the student to allow further specialization and expertise in exercise physiology and training principles, selection and judging, business/farm management, animal genetics and breeding, nutrition, and physiology. With completion of this minor, students will have a foundation of theoretical and practical knowledge along with learning skills for adapting to changes in equine industry. Courses that make up the minor are appropriate for students with and without prior academic or practical experience with horses. The University Horse Farms and the Agricultural Arena are used extensively for supplementing classroom work with hands-on laboratories. Completion of this minor will enhance a student’s ability to work directly in horse production and management and allied industries, or continue academic studies in graduate or professional school.

A grade of C or better must be obtained in each course in order to complete the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 20-22 credits

(At least 6 credits must be at the 400 level.)

**PRESCRIBED COURSES** (12 credits)

- AN SC 201(4), AN SC 217(2) (Sem: 1-4)
- AN SC 327(3) (Sem: 5-8)
- AN SC 407(3) (Sem: 7-8)
- AN SC 407(3) (Sem: 7-8)

**ADDITIONAL COURSES** (8-10 credits)

Select 2 credits from: AN SC 037(2) or AN SC 107(2) (Sem: 1-4)
Select 3-4 credits from: AN SC 300 GN(3), AN SC 301(3), AN SC 317(3), AN SC 322(3), B A 250(3), KINES 180(3), KINES 202(4), or VB SC 403(3) (Sem: 5-8)
Select 3-4 credits from: AGRO 423(3), AN SC 419W(3), AN SC 420(4), AN SC 423(3), AN SC 431W(4), AN SC 437(3), AN SC 457(3) or AN SC 467W(3) (Sem: 5-8)

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-003

Review Date: 02/19/2013
Ethics Minor

University Park, College of the Liberal Arts (ETHCS)

This interdisciplinary minor, housed in the Department of Philosophy, is designed to provide students with training in ethical frameworks and methods, as well as offer the opportunity to work in various fields of applied ethics. In addition to the requirements for the student’s major department the minor consists of 18 credits selected from a wide range of disciplines (including philosophy, communication, engineering, law, psychology, sociology, anthropology, public policy, international studies, and environmental studies). Courses deal with ethics from various perspectives including research ethics, media ethics, environmental ethics, bioethics, and business ethics.

Students in the minor will begin with two core courses. The first will cover basic ethical approaches and the application of ethical analysis. The second will provide a grounding in ethical leadership. The core courses will be followed by a choice of other relevant ethics courses. The minor will be suitable for students in almost any major, especially students going on to further academic work or careers in medicine, communication, business, law, the health or life sciences, health administration, informatics or engineering.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
PHIL 103 GH(3), PHIL 119 GH(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits from an approved list in consultation with the undergraduate adviser for the ethics minor. At least 6 credits must be at the 400 level. Courses must be selected from at least two different departments. (Sem: 5-8)

Last Revised by the Department: Summer Session 2009

Blue Sheet Item #: 37-04-023

Review Date: 1/13/09

LA

Film Studies Minor

University Park: College of Communications and College of the Liberal Arts (FLMST)

The joint minor in Film Studies sponsored by the College of Communications and the College of the Liberal Arts offers students in a variety of disciplines outside of the College of Communications an opportunity to learn more about a visual medium that relates in many ways to other fields such as theatre, literature, history, and art. The focus of this minor is on critical, aesthetic, and historical studies of film, not on the art of filmmaking. The minor enables students to see how the medium influences--and is influenced by--disciplinary outside their specialization. Courses listed for the minor give students a deeper appreciation of the historical development of film during the 20th century. Offerings on cinema from a variety of countries allow students to frame the medium in a global context.

The minor is housed in and administered by the College of Communications but is jointly managed by the Film/Video and Media Studies Department and the French Department. The heads of these units or their designated representatives will chair on a rotating basis the Interdepartmental Film Studies Committee that will make decisions concerning requirements for the minor, including prescribed and supporting courses. The minor is not available to students enrolled in any of the majors in the College of Communications.

Students will choose an adviser from a list of committee members drawn from all participating areas--French, English, German, Italian, Comparative Literature, and Film/Video and Media Studies. In addition to two basic required courses (6 credits), students enrolled in the minor will take an additional 12 credits from a list approved by the Interdepartmental Film Studies Committee. Six of those credits must be at the 400 level. All required and most supporting courses are taught in English. Courses taught in a foreign language are indicated with a footnote.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
COMM 150 GA(3), COMM 250 GA(3) (Sem: 1-6)

SUPPORTING COURSES (12 credits)
Select 12 credits from an approved department list in consultation with an adviser (6 credits must be at the 400 level) (Sem: 5-8)

Last Revised by the Department: Summer Session 2004

Blue Sheet Item #: 32-05-044
Forest Ecosystems Minor

*University Park, College of Agricultural Sciences (FECO)*

The Forest Ecosystems minor introduces students to the functions and values of forested ecosystems. After a prescribed foundation in tree and shrub identification and forest ecology, students may choose from a variety of related subjects including climate change, invasive species, tree physiology, agroforestry, fire ecology, forest soils, forest ecosystem management, forest measurements, community forestry, and global forest conservation.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18-20 credits

**PRESCRIBED COURSES:** (6 credits)
FOR 203(3), FOR 308(3) (Sem: 3-6)

**ADDITIONAL COURSES:** (12-14 credits)
Select a minimum of 12 credits from the following FOR courses. Six credits must be at the 400-level.

Lasted Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06-005

Review Date: 04/08/2014

AG

French and Francophone Studies Minor

*University Park, College of the Liberal Arts (FR)*

The French and Francophone Studies minor is designed to give students the opportunity to improve their knowledge of French language and culture (literature, civilization, film). Courses taken for the minor may also be counted for Basic Degree and major requirements.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (6 credits)
FR 201 IL(3), FR 202 IL(3) (Sem: 1-6)

**ADDITIONAL COURSES** (6 credits)
Select 6 credits from a and b, or b and c, or a and c:

a) FR 316(3) (Sem: 1-6)
b) FR 331 IL(3) or FR 332(3) (Sem: 1-6)
c) FR 351 IL(3) or FR 352 IL(3) (Sem: 1-6)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
Select 6 credits of 400-level French courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2006

Blue Sheet Item #: 34-06-319

Review Date: 4/11/06

LA

Geographic Information Science Minor

*University Park, College of Earth and Mineral Sciences (GIS)*

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*
REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
GEOG 160 GS(3) (Sem: 3-6)

ADDITIONAL COURSES (15 credits)
Select 6 credits from GEOG 361(3), GEOG 362(3), or GEOG 363(3) (Sem: 3-6)
Select 9 credits (at least 6 credits at the 400-level) from GEOG 323(3), GEOG 485(3), GEOG 461W(3), GEOG 467(3), GEOG 417(3), GEOG 459(3), GEOG 463(3), or GEOG 468(3) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2006
Blue Sheet Item #: 34-06-195
Review Date: 4/11/06

Geography Minor

University Park, College of Earth and Mineral Sciences (GEOG)

The Geography minor can complement most majors in the social sciences, physical sciences, biological sciences, and technical disciplines. The geography minor is flexible so that students can tailor their course choices to accommodate individual interests. A broadly based approach to selecting minor courses can be appropriate for students whose majors are highly specialized or narrowly focused. Alternatively, students may choose to fulfill geography minor requirements with a particular content emphasis, such as an interest in environmental issues or urban and regional planning. Looking through course choices and talking with geography staff can make earning the geography minor an important enhancement to one’s academic program.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS (18 credits)
In consultation with a geography adviser:

- Select 3 credits in physical geography (Sem: 3-6)
- Select 3 credits in human geography (Sem: 3-6)
- Select 6 credits of additional geography courses (Sem: 3-6)
- Select 6 credits of 400-level geography courses (Sem: 5-8)

Last Revised by the Department: Summer Session 2000
Blue Sheet Item #: 28-04-090
Review Date: 11/01

Geophysics Minor

University Park, College of Earth and Mineral Sciences (GPHYS)

The Geophysics minor provides the opportunity for students from outside the Geosciences to apply the physics, quantitative, and technical skills they are developing in their major program to the geophysical aspects of Earth Science, including seismology, volcanology, natural hazards, environmental geophysics, and petroleum and mineral exploration. For students majoring in Geosciences, the completion of the minor will strengthen their physics/quantitative background and develop links between theory and application for these technical and quantitative skills. The minor will prepare students for graduate programs in geophysics, and/or employment opportunities in the environmental and exploration industries. The minor consists of 18-20 credits satisfying the requirements below.

A grade of C or better is required for each course in the minor.

Recommended Scheduling by Semester Standing (e.g., Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 29-32 credits

PRESCRIBED COURSES (11 credits)
GEOSC 001(3), MATH 140 GQ(4), PHYS 212 GN(4) (Sem: 3-7)

ADDITIONAL COURSES (18-21 credits)
Select 4 credits from:
Non-Geoscience Majors (i.e., Math, Physics, Engineering):
GEOSC 203(4) (Sem: 3-7)

Geoscience Majors:
PHYS 212 GN(4) (Sem: 3-6)

Non-Geoscience Majors (i.e., Math, Physics, Engineering):
Select 3 credits from: GEOSC 001(3); GEOSC 010 GN(3); GEOSC 040 GN(3); GEOSC 109H GN(3); EARTH 002 GN(3); EARTH 101 GN;US(3); EARTH 105 GN;IL(3); EARTH 106 GN(3) (Sem: 1-4)
Select 11-13 credits from: GEOSC 402Y IL(3); GEOSC 434(3); GEOSC 452(3); GEOSC 483(3); GEOSC 487(3); GEOSC 488(4); GEOSC 489(4) (Sem: 5-8)

Geoscience Majors: (Geoscience majors may not double count these courses in their major)
Select 3-4 credits from: MATH 220 GQ(2-3); MATH 230(4); MATH 231(2); MATH 232(2); MATH 250(3); MATH 251(4) (Sem: 3-6)
Select 11-13 credits from: GEOSC 402Y IL(3); GEOSC 434 (3); GEOSC 452(3); GEOSC 483(3); GEOSC 487(3); GEOSC 488(4); GEOSC 489(4) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-059
Review Date: 8/25/2015

Geosciences Minor

University Park, College of Earth and Mineral Sciences (GEOSC)
The Geosciences minor provides a foundation in the physical and material aspects of the solid Earth, as well as an introduction to field techniques and technical writing. Advanced course work should reflect the students' individual interests. Areas of focus include, but are not limited to: earth materials, evolution of the Earth and life, hydrogeology, environmental geology, natural hazards, plate tectonics, geophysics, climate change. The minor consists of 18 credits of course work, some of which are filled through specific courses as indicated below.

A grade of C or better is required in each course in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (7 credits)
GEOSC 021 GN(3) (Sem: 1-6)
GEOSC 201(4) (Sem: 3-8)

ADDITIONAL COURSES (6 credits)
Select 3 credits from GEOSC 001(3), GEOSC 020 GN(3), or GEOSC 071(3) (Sem: 1-6)
Select 3 credits from GEOSC 470W(3), EM SC 470W(3-6) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (5 credits)
Select 5 credits from a number of courses covering a variety of disciplines and fields of interest. Consult with your adviser. At least 3 credits in this category must be taken at the 400 level; the remaining 2 credits may be at the 200 level or above. (Sem: 5-8)

Last Revised by the Department: Summer Session 2002
Blue Sheet Item #: 30-07-082
Review Date: 4/9/02

German Minor

University Park, College of the Liberal Arts (GER)
The German minor is designed for students who want to study the language, literature, and culture of German-speaking countries in order to broaden their horizons and meet an increasing demand for people with foreign language skills and international expertise. German is one of the most important languages in Western Europe, being the mother tongue of approximately 100 million Europeans, and in the countries of Eastern Europe it is the most important foreign language of business and commerce.

The Department of Germanic and Slavic Languages and Literatures offers a wide array of courses in German language, literature and culture as well as in professional and business German, allowing students great independence in shaping their own academic program. Students are encouraged to take advantage of Penn State's study abroad opportunities, which include semester and year programs in Freiburg, Berlin, and Vienna plus summer and year programs in Marburg.

The German minor opens employment opportunities for its graduates in fields and professions where proficiency in one or more foreign languages is desirable or required, i.e., secondary and higher education, government, business, the media, and public relations.

All courses in the minor must be taught in German and the students must receive a grade of C or better.
Global Health Minor (GLBHL)

University Park, College of Health and Human Development (GLBHL)
Contact: Dr. Dana Naughton, Director, dmn161@psu.edu

The Global Health Minor (GLBHL) is designed to provide undergraduate students with a multidisciplinary exposure to the theoretical and practical issues affecting the health of populations in various countries and regions of the world. This minor is appropriate for students whose career goals incorporate public health interventions, education, policy or research related to global health. Course work and supervised field work will draw on the diversity and abundance of the Penn State faculty's international resources and networks.

Students desiring to enter the minor must submit an application to the Director. Applications to the Global Health Minor:

- must have declared a major field of study
- must include with the application a proposed plan of study. This plan should include the student's contact information and GPA, a brief statement about the relationship of this minor to the student's major plan of study and career goals, a list of proposed supporting courses, and a proposed supervised fieldwork experience. The student's application to the minor must be signed by the student's academic/faculty adviser.
- previously completed course work and/or supervised fieldwork experience may be retroactively included in the plan of study if approved by the Director of the minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 19 credits

PRESCRIBED COURSES: (6 credits)
GER 301 IL(3), GER 302W IL(3) (Sem: 3-5)

ADDITIONAL COURSES: (7 credits)
GER 201 IL(4) or GER 208Y IL(4) (Sem: 3-5)
Select 3 credits from GER 308Y IL(3), GER 310 IL(3) and GER 344 IL(3) (Sem: 4-6)

SUPPORTING COURSES AND RELATED AREAS: (6 credits)
Select 6 credits of 400-level GER courses (Sem: 5-8)

Global Security Minor

University Park, College of Information Sciences and Technology
University Park, College of the Liberal Arts (GLBSC)

The Global Security Minor will be jointly offered by the College of Information Sciences and Technology and the College of the Liberal Arts and overseen by the Department of Political Science. This joint minor is intended to provide students with a background of the theoretical frameworks and skill sets needed to understand the concepts essential to security and
related analyses; the challenges and problems faced when dealing with threats to security (e.g., technology, policies, and regulations); and the strengths and weaknesses of various methods of analyzing and responding to challenges to security. The minor includes a grounding in social, historical, and cultural factors that underlie both conflict between states and conflicts between state and nonstate actors, as well as the legal, ethical, and regulatory issues related to security.

A grade of C or better is required for all courses in the minor.

Scheduling recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18-33 credits

PRESCRIBED COURSES: (9 credits)
SRA 111 GS(3), SRA 211(3), PL SC 007 GS(3) (Sem: 1-8)

ADDITIONAL COURSES (6 credits)

SUPPORTING COURSES AND RELATED AREAS (3-18 credits)
Select 6-13 credits: 12th-credit-level proficiency in one foreign language demonstrated by course work or examination.
Select 3 credits from COMM 490(3), COMM 491(3), COMM 492(3), GEOL 424 US;IL(3), GEOL 428 US(3), GEOL 463(3), GEOL 464(3), HIST 420 IL(3), HIST 434 IL(3), HIST 452 US;IL(3), HIST 467 US;IL(3), HIST 473 IL(3), HIST 475Y IL(3), HIST 479 IL(3), HIST 486 IL(3), or 3 credits of appropriate internship work in consultation with adviser (Sem: 4-8)

Last Revised by the Department: Fall Semester 2007
Blue Sheet Item #: 35-06-459
Review Date: 4/10/07
LA

Greek Minor

University Park, College of the Liberal Arts (GREEK)
The Greek minor focuses on establishing proficiency in reading and interpreting classical Greek literature. After completing an introductory course sequence (elementary classical Greek) that teaches students the vocabulary, morphology and syntax of classical Greek, students complete at least six credits in Greek language and literature at the 400-level for a total of 18 credits for the minor. In advanced courses in Greek language and literature, students gain analytical and interpretive skills by reading a wide range of classical Greek literature, including Greek drama, history, and philosophy, as well as the Greek New Testament. Students minoring in Greek will find their studies mesh well with a number of majors and graduate fields, including anthropology, archaeology, history, English, comparative literature, philosophy, and law.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS: (18 credits)
Select 12 credits of GREEK courses (Sem: 1-8)
Select 6 credits of 400-level GREEK courses (Sem: 5-8)

Last Revised by the Department: Summer Session 2001
Blue Sheet Item #: 29-05-036
Review Date: 11/01
LA

Health Policy and Administration Minor

University Park, College of Health and Human Development (H PA)
Contact: Caroline Condon-Lewis, cxc29@psu.edu

The minor in Health Policy and Administration (H PA) is designed to allow students to learn more about the health care system, health policy, and health administration. The minor is most appropriate for students interested in clinical and health-related fields (e.g., nursing, nutrition, biobehavioral health, or medicine), professional fields (e.g. business administration or law), or the social sciences (e.g., economics, sociology, political science, psychology), giving these students an understanding of the health care industry and the impact of business and government on that industry. Students must take 6 credits of prescribed courses including H PA 101(3), which introduces the organization of the health care system, and H PA 057 GHA(3), which considers the role of the health care consumer in the health care system. Students then focus their study on either health policy or health administration, choosing among courses at the 300 and 400 level. Students select 3-6 credits from H PA 301(3), H PA 310(3), and H PA 332(3) and 6-9 credits from 400-level H PA courses.
A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
H P A 057 GHA(3) and H P A 101(3) (Sem: 3-6)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3-6 credits from H P A 301W(3), H P A 310(3), H P A 332(3) (Sem: 3-6)
Select 6-9 credits from 400-level H P A courses (Sem: 5-8)

Note: Some courses have additional prerequisites that must be met.

Last Revised by the Department: Fall Semester 2002

Blue Sheet Item #: 30-07-092A

Review Date: 01/21/05

HH

Hebrew Minor

University Park, College of the Liberal Arts (HEBR)

The minor in Hebrew is intended to provide students with a good working knowledge of the Hebrew language, taught in a context that emphasizes the characteristics of Jewish tradition and Israeli culture and society. Students undertake three years of language study (or equivalent); education abroad can be included.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (12 credits)
HEBR 001(4), HEBR 002(4), HEBR 003(4) (Sem:1-4)

ADDITIONAL COURSES (9 credits)
Select 3 credits from HEBR 110(3), HEBR 111(3), HEBR 151(3), HEBR 152(3), HEBR 199 IL(1-12) HEBR 296(1-18), HEBR 297(1-9), HEBR 399 IL(1-12), J ST/HEBR 010 GH;IL(3), J ST 012 GH;IL(3) (Sem: 1-8)
Select 6 credits from HEBR 401(3-6), HEBR 402(3-6), HEBR 451(3), HEBR 452(3), HEBR 496(1-18), HEBR 497(1-9), HEBR 499 IL(1-12) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-02-028

Review Date: 10/7/2014

LA

History Minor (HIST)

Contact: Abington College, Tom Smith, trs8@psu.edu; Altoona College, Marc Harris, mjh6@psu.edu; College of the Liberal Arts, Mike Milligan, mjm61@psu.edu; Penn State Berks, Randall Fegley, raf8@psu.edu

The minor in history is designed to complement a wide range of social studies and humanities majors by affording students the opportunity to examine change and development in human societies over time. Students are free to select courses in the topics (military history, social history, cultural history, etc.), geographical areas (the United States, Latin America, Europe, Asia, and Africa), and time periods that most suit their needs and interests. The requirements for entering the minor are fifth semester standing (eligible courses taken previously will count toward the minor) and having already declared a major.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS: (18 credits)
Select 12 credits of HIST courses (Sem: 1-8)
Select 6 credits of 400-level HIST courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001
Horticulture Minor

University Park, College of Agricultural Sciences (HORT)

The minor in Horticulture consists of a minimum of 18 credits. A grade of C or better is required in all courses used for the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
HORT 101(3), HORT 202(3), HORT 315(3) (Sem: 1-6)

ADDITIONAL COURSES (9 credits)
Select 3 credits in systematics from HORT 131(3), HORT 137(3), HORT 138(3), or HORT 232(3) (Sem: 3-4)
Select 6 credits in foundation and production courses from HORT 402W(3), HORT 407(3), HORT 412W(3), HORT 420(3), HORT 431(3), HORT 432(3), HORT 433(3), HORT 450(3), HORT 453(3), HORT 455(3), or HORT 459(3) (Sem: 7-8)

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015

AG

Human Development and Family Studies Minor (HD FS)

Contact: Abington College, Manohar Singh, m.singh@psu.edu; Altoona College, Margaret Benson, enz@psu.edu; College of Health and Human Development, Devon M. Thomas, dmc233@psu.edu; Penn State York, Dr. JeanMarie St. Clair-Christman, jxs176@psu.edu

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
HD FS 129 GS(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 9 credits of HD FS courses (Sem: 1-6)
Select 6 credits of 400-level HD FS courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001

Information Sciences and Technology for Aerospace Engineering Minor

University Park, College of Engineering (ISASP)

The role of Information Sciences and Technology in the practice of Aerospace Engineering is very important. Aerospace systems rely heavily on computers, software, and digital information; for control, sensors, and other onboard systems. The Boeing 777 has more than 1000 processors and roughly 20 million lines of software onboard, and F-16 and F-117As cannot fly without their onboard computers. In addition, many future aerospace vehicles will be unmanned, and the software challenges will be even greater. The onboard memory has also increased exponentially, the F-106 had 20 KBytes of memory and the new Joint Strike Fighter might have 2 GBytes of memory. The hardware and software must be carefully designed and thoroughly tested, since most aerospace systems are mission- or safety-critical systems. Computers and software are heavily used in the design, development, and manufacturing of aerospace systems. Large supercomputers are often used in the design process. The IST minor will enrich their educational achievements and increase their chances in obtaining employment or entering graduate school. The NSF and the DOD are encouraging universities to enhance their educational programs so that we have well-qualified engineers for future systems, and our IPAC members have stressed the importance of IT for our students.

Student must apply for entrance to the minor no later than their 7th semester.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (13 credits)
CMPSC 201C(3), IST 110 GS(3) (Sem: 1-4)
IST 210(3), IST 220(3) (Sem: 5-6)

ADDITIONAL COURSES (6 credits)
Select 6 credits from: AERSP 423(3), AERSP 424(3), AERSP 440(3), or AERSP 460(3) (Sem: 5-8)

Last Revised by the Department: Spring 2015
Information Sciences and Technology for Communication Arts and Sciences Minor

University Park: College of the Liberal Arts (ISCAS)

The Internet and other technologies are emerging as important communication channels. People establish personal relationships, develop language skills, conduct business, and make arguments online. Web sites have become important sites of public discourse and are playing an encompassing role in political campaigns. Students who pursue careers as communication consultants, in management or human resources, as political speech writers, and as independent business operators need information management skills. As a result, it is essential for Communication Arts and Sciences students to be fully versed in information sciences and technology for both personal and professional advancement.

A grade of C or better is required for all courses in this minor.

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
IST 110 GS(3) (Sem: 1-2)
IST 210(3) (Sem: 3-4)
IST 220(3) (Sem: 5-6)

ADDITIONAL COURSES (9 credits)
Select 9 credits of CAS courses from a department-approved list with at least 6 credits at the 400 level. (Sem: 5-8)

Last Revised by the Department: Fall Semester 2014

Information Sciences and Technology for Earth and Mineral Sciences Minor

University Park, College of Earth and Mineral Sciences (ISEMS)

Information Systems are a core component of any research, educational or industrial enterprise in the Earth and Materials Sciences. In addition, the science and engineering disciplines represented in the College have a particular focus on numerical modeling and simulation systems, and on the analysis and management of very large data sets. The EMS - IST minor provides students a basic introduction to information sciences and information technology through courses in the core curriculum of the School of Information Sciences and Technology. Students then select from a group of interdisciplinary EMS courses that focus on the particular interests of the College.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 19 credits

PRESCRIBED COURSES (13 credits)
IST 110 GS(3) (Sem: 1-2)
IST 210(3) (Sem: 3-4)
IST 220(3), GEOG 463(3) (Sem: 5-6)

ADDITIONAL COURSES (6 credits)
Select 6 credits from GEOG 461W(3), GEOG 464(3), GEOG 485(3), MATSE 419(3), METEO 473(3), METEO 474(3), PEN 430(3) (Sem:5-8)

Last Revised by the Department: Spring Semester 2015

Information Sciences and Technology for Industrial Engineering Minor

University Park, College of Engineering (ISTIE)

Collection and processing of information have increased in all sectors for solving engineering problems, including
manufacturing and service related problems. Efficient and timely analysis of data is critical for the survival of companies. There is a need for industrial engineers with a strong background in information technology and systems. The minor in Information Sciences and Technology for Industrial Engineering will augment the skills of students in the Department of Industrial and Manufacturing Engineering in the information systems area. All students pursuing a baccalaureate degree in Industrial Engineering are eligible for this minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (12 credits)
IST 110 GS(3) (Sem: 1-4)
IE 330(3), IST 210(3), IST 220(3) (Sem: 5-6)

ADDITIONAL COURSES: (9 credits)
Select 6-9 credits from IE 418(3), IE 462(3) and IE 433(3) (Sem: 7-8)
Select 0-3 credits from MATH 451(3), MATH 455(3), MATH 456(3), IST 441(3) (Sem: 7-8)

Last Revised by the Department: Spring Semester 2015
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015

Information Sciences and Technology for Labor Studies and Employment Relations Minor

University Park, College of the Liberal Arts (ISLER)
The joint minor in Information Sciences and Technology for Labor and Employment Relations (ISLER) is designed to provide students with the opportunity to develop working knowledge of information technology, labor and employment relations, and their interdisciplinary synergies. The joint minor is designed to prepare students for professional careers in human resource management, labor relations, information systems, software development, consulting, and government.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES: (12 credits)
LER 100 GS(3) (Sem: 1-6)
IST 110 GS(3), IST 210(3), IST 220(3) (Sem: 1-7)

ADDITIONAL COURSES: (6 credits)

Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-03-090
Review Date: 11/18/2014

Information Sciences and Technology for Mathematics Minor

University Park, Eberly College of Science (ISMTH)
The interaction between Information Sciences and Mathematics will continue developing in remarkable new directions. Mathematical scientists enormously benefit from information technology in the performance of research, in communicating and disseminating scientific information and results, as well as in career environments involving data analysis and management. Mathematicians also contribute to making inroads toward the development of new information technologies. Information sciences and technology are already playing a very important role in mathematical education, at all levels, and will experience an overwhelming increase in the near future. Giving undergraduate mathematics students the opportunity to minor in IST will not only enrich their educational achievements but it will also help them succeed in the employment searches.

Students must apply for entrance to the minor no later than the beginning of their senior year.

A grade of C or better is required in all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
IST 110 GS(3) (Sem: 1-2)
Information Sciences and Technology for Telecommunications Minor

University Park, College of Communications (ISTLC)

This minor offers students an opportunity to examine the opportunities and challenges presented by convergence of telecommunications and information processing. Internet-mediated services have the potential of fundamentally changing how we communicate and engage in commerce. This convergence offers faster, better, cheaper, smarter, and more convenient services, but also raises a variety of legal, regulatory, political, social, economic, and technology management issues. The IST/Telecommunications minor offers students enrolled in majors outside the College of Communications and the College of Information Sciences and Technology an opportunity to examine how telecommunications and information processing technologies and services will impact society as well as their individual circumstances.

The Telecommunications requirements of this minor constitute three courses (nine credit hours). Students can fulfill this requirement by completing COMM 180 offered by the Telecommunications Department in the College of Communications and by completing two additional courses from the following list: COMM 479(3), COMM 484(3), COMM 490(3), COMM 491(3) and COMM 492(3). Three IST courses (nine credit hours) constitute the other part of this minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (12 credits)
- IST 110 GS(3) (Sem: 1-2)
- IST 210(3) (Sem: 3-4)
- IST 220(3), COMM 180 GS(3) (Sem: 5-6)

ADDITIONAL COURSES (6 credits)
Select 6 credits from the following: COMM 479(3), COMM 484(3), COMM 490(3), COMM 491(3), COMM 492(3) (Sem: 7-8)

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-05-052
Review Date: 02/24/2015
CM, IS
Publications 10/06/05

Information Sciences and Technology in Health Policy and Administration Minor

University Park, College of Health and Human Development (ISHPA)

Contacts: Health and Human Development -Caroline Condon-Lewis, cxc29@psu.edu; Information Sciences and Technology - Jean Peritz, jperits@ist.psu.edu

The learning objectives of the minor in Information Sciences and Technology in Health Policy and Administration (ISHPA) are to equip students with the skills and knowledge to meet the critical need for persons with expertise in health care information technology. Specialists in this field assist health care organizations develop and apply the information technologies needed to develop Web-based systems for patient education, physician-patient interaction and physician-physician consultation, securely transmit sensitive medical information electronically, and even pioneer efforts for advanced technologies like remote robotic surgery. The ISHPA minor provides students with a solid base in the information sciences and technology through courses in IST’s core curriculum. This core is then supported by selections from a group of HPA courses studying the application of information technology in health planning, financing, or marketing. Students must apply for entrance to the minor no later than the beginning of their seventh semesters.

A grade of C or better is required for all courses in this minor.

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENT FOR THE MINOR: 18 credits

PRESCRIBED COURSES (12 credits)
Information Sciences and Technology Minor

Abington College
Berks College
Capital College
University College: Penn State Beaver, Penn State Brandywine, Penn State Greater Allegheny, Penn State Hazleton, Penn State Lehigh Valley, Penn State New Kensington, Penn State Schuylkill, Penn State Wilkes-Barre, Penn State Worthington Scranton, Penn State York, World Campus
University Park, College of Information Sciences and Technology (IST)

This minor is structured to provide students with the theoretical frameworks and skill sets necessary to compete and be productive in the information technology-intensive global context that defines the new “Information Age.” Specifically, the minor will be focused on a program that will build an understanding of core information technologies and related areas of study; will prepare students for the practical application of various information sciences and related technologies; and engage students in sharpening their abilities to think critically and to work in teams. All this will be done with the intent to expose students to the cognitive, social, institutional, and global environments of Information Sciences and Technology and to then apply that knowledge as a supplement to their major.

A grade of C or better is required for all courses in this minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (9 credits)
IST 110 GS(3), IST 210(3), IST 220(3) (Sem 1-6)

ADDITIONAL COURSES (9 credits)
Select 3 credits from IST 250(3), IST 301(3), or IST 302(3) (Sem 5-8)
Select 6 credits from IST 402(3), IST 431(3), or IST 432(3) (Sem 5-8)

Last Revised by the Department: Fall Semester 2014
Blue Sheet Item #: 43-03-085
Review Date: 11/18/2014

Information Systems and Statistical Analysis Minor

University Park, College of the Liberal Arts (ISSA)

This minor focuses on the use of information systems and statistical methods for solution of human problems. This minor is applicable to any major throughout the University and enhances the student’s preparedness for graduate, research, and career opportunities. A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 19 credits

PRESCRIBED COURSES (10 credits)
CAS 283(3), STAT 200 GQ(4) (Sem: 3-4)
CAS 483(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Students must select 9 credits in consultation with the adviser from courses focusing on information systems or computer science with at least 3 credits at the 400 level. No more than 6 credits may be selected in computer science. (Contact person in charge of the minor for list of appropriate courses.) (Sem: 1-8)

Last Revised by the Department: Fall Semester 1996
Blue Sheet Item #: 24-06-048
Review Date: 10/4/02
Information Systems Management Minor

University Park, Smeal College of Business (ISM)

The Information Systems Management minor focuses on IT supported techniques for exploring, analyzing, integrating, and reporting business data for fact-based decisions. The coursework enables students to study basic concepts, principles, and methods for information analysis, design and management, and to gain an understanding of the best practices for aligning IT-supported analytics with business strategy.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 19 credits

PRESCRIBED COURSES (15 credits)
MIS 301(3), MIS 431(3), SCM 301(3) (Sem: 4-6)
MIS 441(3), MIS 446(3) (Sem: 5-8)

ADDITIONAL COURSES (4 credits)
SCM 200 GQ(4) or STAT 200 GQ(4) (Sem: 1-4)

Latest Revised by the Department: Spring Semester 2014
Blue Sheet Item #: 42-06-023
Review Date: 04/08/2014
UCA Revision #1: 8/9/06

International Agriculture Minor

University Park, College of Agricultural Sciences (INTAG)

This minor is an interdisciplinary program of study designed to enable students to (1) gain an awareness and appreciation for the interrelationship and interdependency of the nations of the world for their food and fiber systems worldwide; (2) gain awareness of problems in international agriculture and sustainability of alternative solutions; (3) understand global impacts of technology, and (4) understand systems of learning across cultures.

This minor requires 18 credits and may be combined with any undergraduate major in the University. Some courses require prerequisites not included in the minor. Foreign language competence is highly recommended.

Students may apply for admission to the minor by completing and submitting an application for admission to Dr. Tom Gill, Office of International Programs, College of Agricultural Sciences, 106 Administration Building, University Park campus. A signature from the student’s major program adviser is required. For more information, contact Dr. Tom Gill, Assistant Director of International Programs, at 814-865-8309 or tbg12@psu.edu; or Dr. Leif Jensen, Distinguished Professor of Rural Sociology and Sociology, at lij1@psu.edu.

A grade of C or better is required for all courses in the minor. Students must have six credits of 400-level course work for the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
INTAG 100 GS;IL(3), INTAG 490(3) (Sem: 6-8)

ADDITIONAL COURSES (12 credits)
Select courses from three of the first four categories (9 credits) and one internationally-oriented experience from Category 5 (3 credits):

Category 1: Socioeconomic and Communication Systems (3 credits)

Category 2: Food, Health, and Nutrition (3 credits)

Category 3: Plant and Animal Sciences (3 credits)
AGECO 134 GN(3), AGECO/ENT 457(3), AGRO 028(3), AN SC 201(4), INTAG 300 IL(3), SOILS 071 GN;IL(3), SOILS 101 GN(3) (Sem: 1-8)

Category 4: Natural Resources and the Environment (3 credits)

Category 5: Select one internationally-oriented experience (3 credits)
INTAG 296(3), INTAG 297(3), INTAG 298(3), INTAG 397(3), INTAG 398(3), INTAG 399(3), INTAG 495(3), INTAG 496(3), INTAG 497(3), INTAG 498(3), INTAG 499 IL(3), or other international embedded course with agricultural content with approval of INTAG minor coordinator, including but not limited to: AGECO 499(3), CED 499(3), E R M 499(3) and EDSGN 497C(1) (Sem: 1-8)
Students are given the option of participating in a semester study abroad program that would be discussed and approved by the INTAG coordinator and the student’s academic advisor. Twelve credits maximum can count toward the minor, and should normally only fulfill elective and internationally-oriented experience credits, and not replace prescribed credits for the minor. The semester study abroad program needs to focus on courses within the food, agriculture or natural resources areas.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-06-001
Review Date: 04/10/2012
AG
Contact information updated: 1/5/12

**International Arts Minor**

*University Park, College of Arts and Architecture (IARTS)*

This interdisciplinary minor is designed for students in any major of the University who wish to supplement their knowledge of the arts of a country or countries other than the United States.

Students enrolled in the minor shall begin by taking the International Arts course and complete the minor with a project pertaining to topics studied for the minor.

Credits applied toward the minor shall represent at least two disciplines and should consist of a coherent selection of courses relating to a geographic, chronological, or thematic concentration.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 19-33 credits

**PRESCRIBED COURSES** (4-6 credits)

A&A 100 GA;IL(3) (Sem: 3-6)
A&A 401(1-3) (Sem: 7-8)

**SUPPORTING COURSES AND RELATED AREAS** (15-27 credits)

Select 0-12 credits: 12th-credit-level proficiency in one foreign language demonstrated by course work or examination (Sem: 1-4)
Select 15 credits of international arts courses (Only 9 credits in a single discipline may apply toward the minor. A minimum of 9 credits must be taken in the College of Arts and Architecture. At least 6 credits must be at the 400 level. At least 3 of these 15 credits must be in a study abroad experience of at least 4 weeks in duration approved by the person in charge of the minor; any arts courses taken while abroad may count toward the minor.) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2004
Blue Sheet Item #: 32-06-014
Review Date: 4/13/04

**AA**

**International Business Minor**

*University Park, Austin Jaffe, aij@psu.edu, Smeal College of Business (I B)*

The International Business minor provides students with knowledge, skills, and experiences that prepare them for a business career that might include international responsibilities. Mastery of fundamental business concepts, coursework in international business or economics, foreign language skills, and an approved study abroad experience each contribute to build perspectives about the challenges and opportunities of commercial activity in a global business environment.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 33-37 credits

**PRESCRIBED COURSES** (7 credits)

ACCTG 211(4) (Sem: 1-4)
B A 411(3) (Sem: 5-8)

**ADDITIONAL COURSES** (14 -18 credits)

MGMT 301(3) or B A 304(3) (Sem: 2-5)
MKTG 301(3) or B A 303(3) (Sem: 3-5)
FIN 301(3) or B A 301(3) (Sem: 4-5)
SCM 301 (3) or B A 302(3) (Sem: 4-5)
Select 6 credits from the following with at least 3 credits at the 400 level: I B 303(3), I B 403(3), I B 404(3), I B/PL SC/AFR 440(3), I B 450(3), or I B 460(3)(Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (12 credits)
Select 6 credits from an education abroad program with prior approval by the Smeal College International Programs Office. (Sem: 4-7)
Select 6 credits of supporting coursework in consultation with the Smeal College International Programs Office. See Program List. (Sem: 5-8)

Last Revised by the Department: Spring Semester 2011
Blue Sheet Item #: 39-05-012
Review Date: 02/22/2011
UCA Revision #1: 8/8/06
BA

**International Studies Minor (INSTD)**

*Contact: Abington College, Manohar Singh, m.singh@psu.edu; Penn State Brandywine, Paul Greene, pdg4@psu.edu; Worthington Scranton, John Dolis, jjd3@psu.edu; College of the Liberal Arts, Henry Morello, hum1@psu.edu*

The International Studies minor is intended to recognize, for undergraduate students in any major, the completion of an education abroad program, foreign language competency, and related advanced course work. Ideally, the language, international, and advanced study should be integrated around some thematic or geographical focus.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18-30 credits

**SUPPORTING COURSES AND RELATED AREAS** (18-30 credits)

12th-credit-level proficiency in one foreign language demonstrated by course work or examination (Sem: 1-4)

Students must complete 12 credits as participants in an approved Penn State Education Abroad Program, no more than 6 credits of which may be foreign language study beyond the 12-credit level (Sem: 5-6)

Select 6 credits (400 level) related to the education abroad experience, or the student's major, or to complete a thematic concentration. Courses must be selected from the approved list of courses with international focus or in consultation with the International Studies Minor adviser (Sem: 5-8)

Last Revised by the Department: Fall Semester 1994
Blue Sheet Item #: 22-06-021
Review Date: 1/30/00

**Italian Minor**

*University Park, College of the Liberal Arts (IT)*

The Italian minor offers training in the skills required for fluency in Italian and knowledge in Italian culture, civilization, and literature. Its aim is to open to the student both the traditions of one of the major formative components of the Western world and the continuing vitality of modern Italian and Italian-American life.

As one of the humanistic programs of the College of the Liberal Arts, the Italian minor is not designed to be directly vocational. Nevertheless, rigorous training in this minor can prepare students for rewarding and unique careers in business, travel, ministry, banking, and education. In addition, the federal government employs liberal arts graduates with foreign-language skills in organizations including the National Security Agency, the Central Intelligence Agency, the U.S. Information Agency, and the Department of Labor. The Italian minor can be preparatory for the major and for study abroad, as well as graduate work directed to the Ph.D. degree required for teaching and research in colleges and universities. Students with backgrounds in the humanities are particularly successful applicants to professional schools, such as law and medicine.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**SUPPORTING COURSES AND RELATED AREAS** (18 credits)

Select 12 credits of Italian courses (Sem: 3-6)
Select 6 credits of 400-level Italian courses (Sem: 5-8)

*Note:* Elementary Italian Language courses (IT 001, 002, and 010) and lower-division Culture and Civilization (IT 130 and 131) or lower division Literature in Translation (IT 230) courses may not be credited toward the minor.

Last Revised by the Department: Spring Semester 2009
Blue Sheet Item #: 37-03-028
Review Date: 11/18/08
LA
Japanese Language Minor

University Park, College of the Liberal Arts (JAPNS)

The minor in Japanese is intended to provide students with a good working knowledge of the Japanese language, culture, and society in order to broaden their horizons and sharpen their awareness in internationalism and globalization. Students undertake three years of language and culture/film/literature study (or equivalent); education abroad can be included.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (8 credits)
JAPNS 002(4), JAPNS 003(4) (Sem: 1-4)

ADDITIONAL COURSES* (10 credits)
Select 4 credits from JAPNS 110 IL(4), JAPNS 296(1-9), JAPNS 297(1-9), or JAPNS 299 IL(1-12) (Sem: 1-8)
Select 6-8 credits from JAPNS 401 IL(4), JAPNS 402 IL(4), JAPNS 403 Y(4), JAPNS 404 IL(4), JAPNS 410 IL(3), JAPNS 421 IL(3), JAPNS 422 IL(3), JAPNS 423 IL(3), JAPNS 424 IL(3), JAPNS 425(3), JAPNS 426(3), JAPNS 450 IL(3), JAPNS 452 IL(3), JAPNS 453 IL(3-6), JAPNS 454 IL(3-6), JAPNS 496(1-18), JAPNS 497(1-9), or JAPNS 499 IL(1-15) (Sem: 5-8)

* Special topics courses in English or other courses in English do not satisfy this requirement.

Last Revision by the Department: Summer Session 2014

Blue Sheet Item #: 43-01-068
Review Date: 08/19/2014

LA

Jewish Studies Minor

University Park, College of the Liberal Arts (J ST)

The Jewish Studies is a flexible interdisciplinary minor for students interested in the study of Jewish history, thought, and culture. Historical coverage ranges from ancient Israel and the contemporary world. Specializations can include, but are not limited to, Modernity and the Jews; Ancient Israel, Bible, and Early Judaism; Holocaust, Anti-Semitism, and Genocide; Jews in America; Jewish Culture and Literature; Israel and Zionism; or Jewish-Christian Relations.

For the Jewish Studies minor, a minimum of 18 credits is required, with at least 6 credits at the 400 level. Up to 9 credits of study abroad may be substituted for supporting course requirements. No more than 4 credits of Modern Hebrew may count toward the requirements for the minor.

All required course work must be completed with a grade of C or higher.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
J ST 010 GH; IL(3)/HEBR 010 GH; IL(3) (Sem: 1-6)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits in Jewish Studies, 6 credits of which must be at the 400 level (Sem: 5-8)
(Up to 9 credits of education abroad courses selected in consultation with the adviser may be applied to the requirements for the minor. No more than 4 credits of Modern Hebrew may count toward the requirements for the minor.)

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-02-029
Review Date: 10/7/2014

LA

Kinesiology Minor

Penn State Berks, Benjamin Infantolino, bwi100@psu.edu
University Park, College of Health and Human Development (KINES)

Contact: Mark Dyreson, mxd52@psu.edu

A grade of C or better is required for all courses in the minor.

Students in the Athletic Training Major are not permitted to obtain a Kinesiology Minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)
Labor Studies and Employment Relations Minor

University Park, College of the Liberal Arts (LER)
World Campus

This interdisciplinary minor is designed for students in any major of the University who wish to supplement their knowledge in the areas of labor studies and industrial relations. The minor consists of 18 credits, at least 6 of which must be at the 400 level. A certificate is awarded to students who complete the requirements of the minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
(at least 6 credits at the 400 level)

PRESCRIBED COURSES (3 credits)
LER 100 GS(3) (Sem: 1-6)

ADDITIONAL COURSES (3 credits)
LER 201 GS(3) or LER 401(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3-6 credits in Labor and Industrial Relations (Sem: 5-8)
Students may select, in consultation with their Labor Studies and Employment Relations adviser, 6-9 credits from courses in business administration, economics, management, political science, psychology, and sociology (Sem: 1-8)

Latin American Studies Minor

University Park, College of the Liberal Arts (LATAM)

This interdisciplinary minor is designed for students in any college or program of the University who want to supplement their knowledge and skills with the study of Latin America. A certificate is awarded to students who complete the requirements of the minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18-19 credits

PRESCRIBED COURSES (3 credits)
PL SC 456(3) (Sem: 1-4)

ADDITIONAL COURSES (6-7 credits)
HIST 178 GH;IL(3) or HIST 179 GH;IL(3) (Sem: 1-4)
PORT 001(4) or SPAN 100(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits (at least 3 credits at the 400 level) from an approved list in consultation with the adviser. (Sem: 1-4)
Latin Minor

University Park, College of the Liberal Arts (LATIN)

The Latin minor emphasizes the development of skills in the linguistic and literary aspects of the Latin language. Through 18 credits of course work, including 6 at the 400-level, students develop mastery of the grammatical structures essential to the ability to read Latin; a vocabulary adequate to the sight recognition of a large number of Latin vocabulary items; and a thorough understanding of the formal system of word inflection and derivation which forms the grammatical core of the language. Once students have completed the basic 12 credits in LATIN 001, LATIN 002 and LATIN 003, they have the opportunity to pursue their studies in a wide variety of 400-level courses, which include prose authors such as historians, poets who wrote in epic and elegiac styles, playwrights, and other literary stylists who round out the vast body of Latin literature. In addition, 400-level courses are available on such topics as Latin prose composition, in which students learn to write Latin, and Latin linguistic history. The minor is appropriate for a wide number of majors, including history, medieval studies, archaeology, medicine, philosophy, and law.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 12 credits of LATIN courses (Sem: 1-8)
Select 6 credits of 400-level LATIN courses (Sem: 5-8)

Last Revised by the Department: Summer Session 2001
Blue Sheet Item #: 29-05-036
Review Date: 11/01

Latina and Latino Studies Minor

University Park, College of the Liberal Arts (LTNST)

This minor in Latina and Latino Studies offers students across the University an opportunity to learn about the diverse histories, cultures, politics, migration patterns, and other aspects of Latina/o populations in the United States. Classes will be offered on Latino history; the artistic achievements of Latinas/os in popular culture, literature, theatre, film, and television; the migratory flows of Latina/o populations; education; other issues related to language and identity; and family issues. These courses demonstrate that studying Latino/a social formations is a critical component of understanding the social fabric of the U.S. as well as the U.S. presence in Latin America and the complex phenomenon of globalization. Although the emphasis of Latina/o Studies is on the U.S., the role of Latina/o immigration within wider shifts related to globalization requires an understanding of Mexico, Central and South America, and the Spanish-speaking Caribbean.

The minor consists of 18 credits, at least 6 of which must be at the 400 level.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
LTNST 100 GH;US(3) (Sem: 1-6)

ADDITIONAL COURSES (9 credits)
Select 9 credits from LTNST 226(3) or ENGL 226 GH;US;IL(3), LTNST 300 US(3) or WMNST 300 US(3), LTNST 315 GH;US(3) or SPAN 315 GH;US(3), LTNST 326 GH;US(3) or SPAN 326 GH;US(3), LTNST 403(3) or CMLIT 403(3), LTNST 426(3) or ENGL 426 US(3), and 3 credits of SPAN 003(4) or above. (Sem: 1-8)

SUPPORTING COURSES AND RELATED AREAS: (6 credits)
Select 6 credits from approved list in consultation with an academic adviser.

Last Revised by the Department: Fall Semester 2006
Blue Sheet Item #: 34-06-321
Review Date: 4/11/06

Leadership Development Minor
University Park, College of Agricultural Sciences (L DEV)

This minor is designed for students in any major of the University wanting to supplement their program with studies in leadership development. The minor consists of 18 credits, at least 3 of which are an internship experience. This minor provides students with a fundamental concept of leadership development and expands in three related dimensions. A grade of C or better is required in all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (12 credits)
AEE 311(3), AEE 360(3) (Sem: 5-6)
AEE 460(3), AEE 495(3) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with an adviser from courses on the Department approved list that focus in one of three support areas: leadership styles, ethical and moral dimensions of leadership, or global leadership (Sem: 1-8)

Last Revised by the Department: Fall Semester 2000

Blue Sheet Item #: 28-03-005

Review Date: 1/11/00

AG

Legal Environment of Business Minor

University Park, Jeff Sharp, jms16@psu.edu, Smeal College of Business (LEBUS)

This minor presents students with a structured study of the statutory and common law governing the business environment. Students in this program have the opportunity to learn advanced legal subject matter, including business organization structures, employment law, property law, commercial transactions, intellectual property, environmental law, and government regulation. Content is framed around the organization and support of complex business enterprises from a legal perspective. This includes complex legal transactions, litigation support and avoidance, and the development of enterprises. The emphasis on the complex nature of legal organization formation, transactions, and litigation support is provided through a rigorous selection of business law and core business courses.

A grade of C or better is required in all courses used to meet the requirements of the LEBUS minor. For admission to the minor, students must have completed ACCTG 211(4) and ECON 102(3) with grades of C or better.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
(At least 6 credits must be at the 400 level)

PRESCRIBED COURSES (12 credits)
ECON 104 GS(3) (Sem: 1-4)
FIN 301(3), B LAW 341(3), B LAW 441(3) (Sem: 6-8)

ADDITIONAL COURSES (6 credits)
Select 6 credits from the following:
B LAW/R M 424(3), B LAW/R M 425(3), B LAW 444(3), B LAW 445(3), B LAW 446(3) (Sem: 6-8)

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-06-052A

Review Date: 04/10/2012

BA

Linguistics Minor

University Park, College of the Liberal Arts (LING)

This minor is designed for students in any major of the University who wish to supplement their knowledge in the area of linguistics. The minor consists of 18 credits. A certificate is awarded to students who complete the requirements of the minor.

For more information on the Linguistics Program, visit our Web site: http://linguistics.la.psu.edu.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
LING 402(3), LING 404(3) (Sem: 5-8)

ADDITIONAL COURSES (3 credits)
LING 001 GS(3) or LING 100 GS(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 9 credits from LING offerings (Sem: 5-8)

Last Revised by the Department: Summer Session 2001
Blue Sheet Item #: 29-03-060
Review Date: 11/21/00
LA

Mathematics Minor (MATH)

Contact: Altoona College, Dan DiLeo, dxd22@psu.edu; Eberly College of Science, James Sellers, jxs23@psu.edu

The minor is designed to provide students with an interest in mathematics an opportunity to study a broad range of mathematical topics. The requirements allow students a great deal of flexibility in choosing courses of interest.

A grade of C or better is required for all courses in the minor.

Scheduling recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 26-28 credits

PRESCRIBED COURSES (8 credits)
MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-4)

ADDITIONAL COURSES (6-8 credits)
Select 6-8 credits from MATH 220 GQ(2-3), MATH 230(4), MATH 231(2), MATH 232(2), MATH 250(3), MATH 251(4), MATH 310(3), MATH 311W(3-4), or MATH 312(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 12 credits of 400-level MATH courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001
Review Date: 5/10/04
UCA Revision #1: 8/9/06

Media Studies Minor

University Park, College of Communications (MEDIA)

The Media Studies minor is designed for students who want to develop their knowledge of the mass media from a variety of approaches, including aesthetic, humanistic, social-behavioral, and legal-policy. This minor is a theory-based rather than a professional program. In fact, students in the minor may not take professional skills communications courses as part of this program. The minor consists of 18 credits, at least 6 of which must be at the 400 level. The minor is not available to students enrolled in any of the majors in the College of Communications.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (3 credits)
COMM 100 GS(3) (Sem: 1-2)

ADDITIONAL COURSES (15 credits)
Select 3 credits from COMM 110 GH(3), COMM 150 GA(3), COMM 118 GS(3) or COMM 180 GS(3) (Sem: 3-6)

Last Revised by the Department: Summer Session 2008
Blue Sheet Item #: 36-05-022
Review Date: 2/26/08
Department head updated by Publications: 1/16/07


**Meteorology Minor**

*University Park, College of Earth and Mineral Sciences (METEO)*

Students pursuing the 39-credit Meteorology minor seek to broaden their education by specializing in an applied science. As for Meteorology majors, students minoring in Meteorology must have a strong background in Mathematics and Physics. Eleven of the 20 Meteorology credits come from the three required courses of METEO 300, METEO 421, and METEO 431. The remaining nine credits come from 100-, 200-, 300-, or 400-level METEO courses, at least one of which must be at the 400 level. Completion of the three required courses ensures that students will have the foundational atmospheric science material that they need to register for the remaining nine Meteorology credits. In consultation with a Meteorology adviser, students may choose these elective courses from a variety of sub-specialties, including Air Quality Studies, Atmospheric Dynamics, Atmospheric Physics, Climatology, Computer Applications, and Weather Analysis and Forecasting.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 39 credits

**PRESCRIBED COURSES** (30 credits)

- METEO 300(4), METEO 421(4), METEO 431(3) (Sem: 5-6)
- CHEM 110 GN(3), MATH 231(2), MATH 232(2), MATH 251(4), PHYS 211 GN(4), PHYS 212 GN(4) (Sem: 5-6)

**ADDITIONAL COURSES** (9 credits)

Select 9 credits of 100-, 200-, 300-, or 400-level Meteorology; at least 3 credits must be at the 400 level. (Sem: 5-8)

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-060

Review Date: 8/25/15

**Microbiology Minor**

*University Park, Eberly College of Science (MICRB)*

The minor in Microbiology is a collection of required and elective courses that (1) provides a limited but sound foundation in the discipline, (2) requires students to develop reasonable expertise in handling and characterizing microorganisms, and (3) permits students to emphasize some subdiscipline of microbiology in which they may have a particular interest. The minor specifies the introductory lecture and laboratory courses in microbiology and one course each in immunology and cell biology. A minimum of two laboratory courses exposes students to basic and experimental/applied techniques. Sufficient room exists within the minor for selection of two or three elective courses at the advanced level that may emphasize a specialty area of the discipline such as virology or microbial genetics. Students who complete the minor have a sufficient background to pursue positions in industry that require an appreciable expertise in microbiology.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 24 credits

**PRESCRIBED COURSES** (17 credits)

- CHEM 110 GN(3), CHEM 112 GN(3), MICRB 201(3), MICRB 202(2), MICRB 251(3) (Sem: 3-4)
- MICRB 410(3) (Sem: 5-6)

**ADDITIONAL COURSES** (2-3 credits)

Select 2-3 credits from MICRB 421W(3) or MICRB 422(2) (Sem: 5-6)

**SUPPORTING COURSES AND RELATED AREAS** (4-5 credits)

Select 4-5 credits of 400-level MICRB courses (Sem: 5-8)

*Note:* B M B 442(3), MICRB 408(1-2), MICRB 496(1-18) and MICRB 497(1-9) may not be used to fulfill the requirements for the minor.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

**Middle East Studies Minor**

*University Park, College of the Liberal Arts (MESTU)*
This interdisciplinary program is designed for students having special interest in the geographical area that includes Afghanistan, Iran, Turkey, and the Arabic-speaking countries of southwestern Asia and northern Africa. In addition to the requirements for the minor, students may select other courses dealing with the Middle East, subject to the approval of the Middle East Studies Committee. A certificate is awarded to students who complete the requirements of the minor.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
(Some courses in this minor have prerequisites that are not required by the minor.)

ADDITIONAL COURSES (3 credits)
Select 3 credits from HIST 165(3) HIST 181 GH;IL(3), HIST 471W(3), HIST 472 IL(3), HIST 473 IL(3), RL ST 107 GH;US;IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (15 credits)
Select 15 credits, at least 6 at the 400-level, from approved program list in consultation with the professor in charge of the minor. (Sem: 5-8)

Last Revised by the Department: Summer Session 2004
Blue Sheet Item #: 32-01-080
Review Date: 9/2/03

LA

Mining Engineering Minor

University Park, College of Earth and Mineral Sciences (MNG E)
Professor Jeffery Kohler, Program Officer

The minor in Mining Engineering offers a specialized program for students in many other broad-based, technical majors, such as those in engineering or science. The demand for professionals with the training and skills for a career in the minerals- and energy-recovery profession far exceeds the supply. Mineral exploration and evaluation, mine development, marketing, health and safety, environmental protection, and mine management are all areas of industry employment. It is recommended that students wishing to pursue this minor come from an engineering or science major. As a result, the selection of this minor can provide additional career options for students in a wide range of offerings at Penn State.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (18 credits)
MNG 230(3), MNG 331(3), MNG 404(2), MNG 410(2), MNG 412(3), MNG 422(3), and MNG 441(3) (Sem: 3-8)

Review Date: Fall Semester 1997

EM

Mushroom Science and Technology Minor

University Park, College Of AGRICULTURAL SCIENCES (M S T)
JOHN PECCHIA, RES ASSOC/ASST PROF PPEM

This interdisciplinary minor is designed to prepare students for a career in the mushroom industry. The minor offers practical work experience at the University's Mushroom Research Center. Students are required to complete a minimum of 22 credits. The core of prescribed courses provides a foundation in the basic fundamentals of mushroom science and technology. A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

For the MINOR in Mushroom Science and Technology Minor a minimum of 22 credits are required.

REQUIREMENTS FOR THE MINOR: 22 credits

PRESCRIBED COURSES (13 credits)
BIOL 110 GN(4), PPEM 405(3), PPEM 425(4), PPEM 496(1-18) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)
Select 9 credits from: AG BM 200(3); ENT 202 GN(3); ENT 313(2); FD SC 408(2); FD SC 409W(3); MGMT 150(3); MICRB
Music Performance Minor

University Park, College of Arts and Architecture (MUSIC)
PROFESSOR SUE HAUG, Director, School of Music

The minor in music performance serves a wide variety of needs among the students who elect it. Those who have studied voice or an instrument through their high school years may pursue that study at a more advanced level. Participants in bands, orchestras, and choirs want to continue that activity at a higher level. Some find the minor an important adjunct to other studies such as speech pathology and audiology, speech communication, or broadcasting. This minor provides students in very demanding majors to build music performance into their lives as a balancing influence. Admission to the minor depends upon a successful performance audition.

A grade of C or better is required for all courses in the minor.

Scheduling recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

SUPPORTING COURSES AND RELATED AREAS (21 credits)
Select 8 credits in applied music through Level IV: Primary (Sem: 1-8)
Select 4 credits in ensembles (Sem: 1-8)
Select 3 credits of electives in MUSIC (Sem: 1-8)
Select 6 credits at the 400 level in MUSIC (Sem: 5-8)

Music Studies Minor

University Park, College of Arts and Architecture (MUSST)
PROFESSOR SUE HAUG, Director, School of Music

The minor in music studies provides students the opportunity to conduct focused study on music theory, history and literature. The minor may also serve as an important adjunct to other studies such as speech pathology and audiology, speech communication, or broadcasting. Some students choose to add the music studies minor as a balancing influence to coursework in their majors; others relate music studies directly to their major. For example, a recent Schreyer Honors College history major did her thesis on song during the Civil War. Admission to the minor depends upon the ability to read musical notation, which is assessed by a music theory assessment test offered during the annual audition days. Each student registers for core courses in music theory, history and literature. Students usually opt to focus on one of the three areas in their upper-level courses.

A grade of C or better is required for all courses in the minor.

Scheduling recommendations by Semester Standing given like (Sem:1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (8 credits)
MUSIC 131(2), MUSIC 132(2), MUSIC 231(2), MUSIC 331(2) (Sem: 1-4)

ADDITIONAL COURSES: (3 credits)
MUSIC 261(3) or MUSIC 262(3) (Sem: 3-4)

SUPPORTING COURSES AND RELATED AREAS: (10 credits)
Select 4 credits in ensembles (Sem: 1-8)
Select 6 credits at the 400-level in MUSIC (Sem: 5-8)
Music Technology Minor

University Park, College of Arts and Architecture (MUTEC)

Administered by faculty from the College of Arts & Architecture's School of Music, School of Theatre, and Department of Integrative Arts, the minor in Music Technology is appropriate for undergraduate students seeking to apply domains of knowledge from their majors or General Education programs to issues of audio production and digital technology in music.

The program consists of prescribed foundation courses in musical acoustics, digital audio, sound design and audio recording. Supporting course work allows students to focus in advanced topics such as music software programming, multi-media, or entertainment systems.

The Music Technology Minor Committee is authorized to award a minor certificate to any undergraduate who, in addition to satisfying the degree requirements of his or her baccalaureate major, satisfies the requirements for the Music Technology minor. The completion of the minor is reflected by a formal notation in the student's official record at the time of graduation.

Students must declare a major before they may request admission to a minor. However, those interested in the music technology minor are encouraged to begin taking applicable courses as early as possible. Students must apply to the minor no later than the beginning of their 6th semester. Students who have earned at least a grade of C in INART 050, INART 258A and THEA 285 may apply for admission to the program by submitting an application to the Committee.

For more information about the music technology minor, check the School of Music website at http://music.psu.edu/prospective/mustechminor.html.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (15 credits)
INART 050 GN(3), INART 258A GA(3), MUSIC 008 GA(3) (Sem: 1-4)
THEA 285(3), THEA 484(3) (Sem: 4-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits in consultation with the minor advisor with at least 3 credits at the 400 level. (Sem: 5-8)

Last Revised by the Department: Summer Session 2006
Blue Sheet Item #: 34-05-002; 40-02 RT-222; 41-02 RT230
Review Date: 2/28/06; 09/27/11
AA

Nanotechnology Minor

University Park, College of Engineering (NANO)

The Nanotechnology minor is designed to help prepare students from diverse disciplines for careers in a broad range of industries innovating with nanotechnology. The minor builds on the singular strengths of Penn State's nanofabrication facilities including its class 1 and class 10 clean rooms, its faculty, and existing academic programs. The minor provides students with fundamental knowledge and skills in simulation, design, modeling, syntheses, characterization, properties, processing, manufacturing, and applications at the nano scale.

As nanotechnology increasingly bridges across disciplines, a basic understanding of mathematics, physics, biology, and chemistry is recommended. To complete the 18 credit nanotechnology minor, students will take two prescribed courses (6 credits) in nanoscience fundamentals, and then select four additional courses (12 credits) from a growing list of courses that address the areas described in the previous paragraph. A grade of C or better is required for all courses in the minor.

In addition to nanotechnology career opportunities in microelectronics, information storage, optoelectronics, bioelectronics, pharmaceuticals, agriculture, medicine, life sciences and the sciences, the minor prepares undergraduate students to support major new nanotechnology research programs as graduate students. Interested 3rd and 4th year students from related fields in engineering, the chemical, physical, and the biological sciences, medicine, life, and agricultural sciences are encouraged to enroll.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES: (6 credits)
E SC 312(3), E SC 313(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS: (12 credits)
Select 12 credits from an approved list, at least 6 credits must be at the 400 level. (Sem: 5-8)

Last Revised by the Department: Summer Session 2006
Blue Sheet Item #: 34-04-029
Natural Science Minor (NATSC)

Contacts: Altoona College, David Hurtubise, dhx40@psu.edu; Berks College, Ike Shibley, ias1@psu.edu; Eberly College of Science, Ron Markle, ram29@psu.edu

This interdepartmental minor in Natural Science is designed for nonscience students who wish to gain a better appreciation for science and the scientific method. The courses required in the minor include 3 to 4 credits of general education science designed for nonscience students, 3 to 4 credits of mathematical science, including some laboratory work, and 6 credits of 400-level science courses. Certain combinations of courses are disallowed (as listed in the curriculum description), and higher-level courses are generally accepted as substitutes for lower-level courses if both are offered by the same department. Any substitutes for laboratory courses must also be laboratory courses. Advising for students in this minor will be available through the Eberly College of Science Academic Advising Center and approval of curriculum exceptions will be through the faculty committee and professor in charge of the program.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 20-23 credits

PRESCRIBED COURSE (1 credit)
SC 400(1) (Sem: 5-8)

ADDITIONAL COURSES (14-17 credits)
Select 3-4 credits from ASTRO 001 GN(3), ASTRO 010 GN(2) and ASTRO 011 GN(1), B M B 001 GN(3), BI SC 001 GN(3), BI SC 002 GN(3), BI SC 003 GN(3), BI SC 004 GN(4), CHEM 001 GN(3), CHEM 003 GN(3), MICRB 106 GN(3) and MICRB 107 GN(1), PHYS 001 GN(3) (Sem: 1-4)
Select 3-4 credits from CMPSC 101 GQ(3), CMPSC 121 GQ(3), CMPSC 201 GQ(3) or CMPSC 202 GQ(3), CMPSC 203 GQ(4), MATH 110 GQ(4), MATH 140 GQ(4), STAT 200 GQ(4), STAT 250 GQ(3) (Sem: 3-6)
Select 8-9 credits from BIOL 011 GN(3) and BIOL 012 GN(1), BIOL 110 GN(4), CHEM 110 GN(3) and CHEM 111 GN(1), CHEM 112 GN(3) and CHEM 113 GN(1), MICRB 201(3) and MICRB 202(2), PHYS 250 GN(4), PHYS 251 GN(4) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (5 credits)
Select 0-2 credits of 496 (independent studies) courses from the Eberly College of Science course offerings (Sem: 5-8)
Select 3-5 credits of 400-level courses (other than independent studies) from the Eberly College of Science course offerings (Sem: 5-8)

[62] A student may not use credit for BI SC 001 GN(3) or BI SC 002 GN(3) along with credit for BIOL 011 GN(3) and BIOL 012 GN(1), or BIOL 011 GN(4); CHEM 001 GN(3) or CHEM 003 GN(3) along with credit for CHEM 110 GN(3) and CHEM 111 GN(1) or CHEM 112 GN(3) and CHEM 113 GN(1); PHYS 001 GN(3) along with credit for PHYS 250 GN(4) or PHYS 251 GN(4); MICRB 106 GN(3) and MICRB 107 GN(1) along with credit for MICRB 201(3) and MICRB 202(2).

Nutritional Sciences Minor

University Park, College of Health and Human Development (NUTR)

Contact: Brenda Eissenstat, bre2@psu.edu

A grade of C or better is required for all courses in the minor.

Scheduling recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (11 credits)
NUTR 251 GHA(3) (Sem: 1-4)
NUTR 358(2) (Sem: 3-6)
NUTR 445(3), NUTR 446(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (7 credits)
Select 7 credits from NUTR courses (Sem: 5-8)

Nutritional Sciences Minor

University Park, College of Health and Human Development (NUTR)

Contact: Brenda Eissenstat, bre2@psu.edu

A grade of C or better is required for all courses in the minor.

Scheduling recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (11 credits)
NUTR 251 GHA(3) (Sem: 1-4)
NUTR 358(2) (Sem: 3-6)
NUTR 445(3), NUTR 446(3) (Sem: 5-6)

SUPPORTING COURSES AND RELATED AREAS (7 credits)
Select 7 credits from NUTR courses (Sem: 5-8)
Off-Road Equipment Minor

*University Park, College of Agricultural Sciences (OFFRD)*

This interdisciplinary minor complements several engineering, agricultural, and mining degrees, helping students understand some specific technological aspects of mobile equipment (from lawn tractors to large excavators). The minor would strengthen the program for students with machinery interests by exposing them to several of the technical aspects of off-road equipment such as electronics, power generation, power transmission, traction, ergonomics, and safety.

The minor in Off-Road Equipment requires 18-21 credits from the approved courses. Courses in the minor have prerequisites including calculus, physics, and, depending on the student’s major, at least one engineering or engineering technology type course (e.g., BRS 221). These courses should be completed prior to entering the minor.

A grade of C or better is required for all courses taken to satisfy the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18-21 credits

**PRESCRIBED COURSES** (3 credits)
A S M 420(3) (Sem: 6-8)

**ADDITIONAL COURSES** (15-18 credits)
Select 3 credits from A S M 320(3) or M E 431(3) (Sem: 5-8)  
Select 3-4 credits from B E 303(3) and B E 306(3), or A S M 310(3) or M E 360(3) (Sem: 5-8)  
Select 3-4 credits from B E 305(3), BRS 428(3), or M E 345(4) (Sem: 5-8)  
Select 3-4 credits from A S M 424(3), AGRO 425(3), HORT 408(4), or TURF 425(3) (Sem: 5-8)  
Select 3 credits from B E 461(3) or BRS 426(3) (Sem: 5-8)

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-01-002
Review Date: 8/25/09
UCA Revision #2: 7/30/07

Pennsylvania Studies Minor

*University Park, College of the Liberal Arts (PASTU)*

This minor is for students who want to emphasize the history, culture, politics, and other important features of Pennsylvania in their academic programs. The minor consists of 18 credits, at least 6 of which must be at the 400 level. A certificate is awarded to students who complete the requirements of the minor.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (3 credits)
HIST 012 GH;US(3) (Sem: 1-4)

**ADDITIONAL COURSES** (6-9 credits)
Select 6-9 credits from GER 157 GH;US(3), HIST 150 US(3), HIST 200 US(3), AM ST 050 GH(3), or PL SC 125(3) (Sem: 3-6)

**SUPPORTING COURSES AND RELATED AREAS** (6-9 credits)
Students may select, in consultation with their Pennsylvania Studies adviser, 6-9 credits from among courses that focus substantially on Pennsylvania. At least 6 credits must be at the 400 level. A partial list of such courses includes LER 100 GS(3), LER 433(3), L A 496(1-18), PL SC 130 GS;US(3), PL SC 426(3), SOC 454(3). With the approval of the Pennsylvania Studies adviser, students may count up to 3 credits for internships in Pennsylvania. Students may enroll in the College of the Liberal Arts internship program or a departmental internship program. (Sem: 3-8)

Last Revised by the Department: Summer Session 1988
Review Date: 3/12/02

LA

Petroleum and Natural Gas Engineering Minor

*University Park, College of Earth and Mineral Sciences (PNG E)*

PROFESSOR Russell Johns, Program Officer
The minor in petroleum and natural gas engineering is for students interested in the drilling and production of oil and gas. It provides an opportunity for students to understand and appreciate the relationship between petroleum and natural gas demand, production and their environment impact. Students are exposed to the basic courses in petroleum and natural gas extraction, particularly as they relate to drilling, production and characterization. A minimum of 18 credits is required for the minor. A student enrolled in this minor must receive a grade C or better in all courses in the minor. Advising is available through the professor in charge.

Scheduling Recommendations by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 23 credits

PRESCRIBED COURSES (14 credits)

ADDITIONAL COURSES (9 credits)
Select 9 credits from the following list:
P N G 489(3), P N G 496(1) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-061

Review Date: 8/25/2015

Review Date: 09/28/2010

Philosophy Minor (PHIL)

Contact: Penn State Fayette, Evelyn Pluhar-Adams, exp5@psu.edu; College of the Liberal Arts, Emily Grosholz, erg2@psu.edu

Many students find that their studies in their major field can be profitably supplemented by pursuing their studies in philosophy. The Philosophy minor is designed for students who desire a significant background in philosophy while majoring in a different field. Students from many disciplines pursue the Philosophy minor, including English, History, Physics, Mathematics, Management Studies, and so on. Declaring a minor in Philosophy will allow you to continue your philosophy studies throughout your degree, and you will receive a certificate in Philosophy when you graduate.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

SUPPORTING COURSES AND RELATED AREAS (18 credits)
In consultation with a faculty adviser:
Select 6 credits of Philosophy courses (Sem: 1-6)
Select 6 credits of Philosophy courses at the 200 level (Sem: 3-6)
Select 6 credits of Philosophy courses at the 400 level (Sem: 5-8)

Last Revised by the Department: Fall Semester 2001

44-04-081 Change. Increase the number of credits required for the Major from 21-23 to 29-31 credits.

Effective Date: Summer 2016

Physics Minor

Eberly College of Science (PHYS)

Contact: Eberly College of Science, Richard Robinett, rg9@psu.edu
Contact: Behrend College, Bruce Wittmershaus, bpw2@psu.edu
Contact: Penn State Berks, Leonard Gamberg, lpg10@psu.edu

The Department of Physics offers a minor for students who wish to expand upon their study in this fundamental discipline, beyond the introductory courses (PHYS 211, PHYS 212, PHYS 213, PHYS 214). In addition to an additional course in modern physics (PHYS 237, which includes introductions to relativity and quantum theory, as well as applications), students take two 400-level PHYS courses for a total of 6-8 credits. The Physics minor is useful for students in many STEM disciplines who wish to extend their studies in this fundamental field, as a background for graduate study or work in a variety of technical fields.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 29-31 credits

PRESCRIBED COURSES (23 credits)
MATH 140 GQ(4), MATH 141 GQ(4), PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2), PHYS 237(3)
**Plant Pathology Minor**

*University Park, College of Agricultural Sciences (PPATH)*

The Plant Pathology minor is designed for students who wish to learn more about the causes and control of plant diseases. These students may pursue careers in commercial crop production, industrial sales, private consulting, extension, or research. Increasing emphasis on biological control, integrated pest management, and sustainable agricultural practices requires knowledge of plant pathogen biology, host-parasite interactions, and environmental parameters influencing disease development. The Plant Pathology Minor focuses on these areas and gives students the background necessary to develop or utilize environmentally sound disease management strategies. This program is designed to supplement majors in any field of the biological sciences and also can be used to prepare students for graduate studies in Plant Pathology.

The minor in Plant Pathology requires 22 credits in approved courses in addition to the major requirements of the student's choice.

Students must receive a grade of C or better in all courses required for the minor.

*Scheduling Recommendation by Semester Standing given like (Sem:1-2)*

**REQUIREMENTS FOR THE MINOR:** 22 credits

**PRESCRIBED COURSES** (7 credits)**[1]**

BIOL 110 GN(4) (Sem: 1-4)

*3 credits of PPEM 496 (1-18) (Sem: 5-8)*

**ADDITIONAL COURSES** (15 credits)**[1]**

**Select 3 credits from:** PPEM 300 GN(3), PPEM 405(3) (Sem: 5-6)

Select a minimum of 12 credits from: AGECO 121 GN(3), AGECO/ENT 457(3), PPEM 120 GN(3), PPEM 300 GN(3), PPEM 318(2), PPEM 405(3), PPEM 412(3), PPEM 416(3), PPEM 417(3), PPEM 425(4), PPEM 430(3), PPEM 454(3), *PPEM 496(1-3), PPEM 497(1-3), and the departmental list of additional courses for the Plant Pathology Minor with the approval of the minor adviser. (Sem: 3-8)

*Students must select, in consultation with the Plant Pathology Minor adviser, at least 3 credits of PPEM 496 (Independent Study) working with one or more faculty in the department of Plant Pathology and Environmental Microbiology. An additional three Independent Study credits may be applied to the Minor requirements as Additional Courses.*

** Students may select one of these two courses for the second list of Additional Courses, but the same course cannot be counted toward both lists.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

AG

**Political Science Minor (PL SC)**

*Contact: Altoona College, Dan DiLeo, dxd22@psu.edu; Capital College, Steve Peterson, sap12@psu.edu; Penn State Berks, Randy Newnham, ren2@psu.edu; Penn State Fayette, Brad Whitset, bcw4@psu.edu; College of the Liberal Arts, James Piazza, jap45@psu.edu*

The Political Science minor consists of 18 credits with at least one course in each of the following Political Science areas: American, theory/methodology, comparative, and international relations. Six (6) of these 18 credits must be at the 400 level.

When electing this minor, the student should have junior (fifth-semester) standing. Special attention should be given to the fact that courses used to satisfy general education, degree requirements, electives, and major requirements may also be used to satisfy minor requirements.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*
REQUIREMENTS FOR THE MINOR: 18 credits
ADDITIONAL COURSES (18 credits)
Select 18 credits in Political Science (at least 6 credits at the 400 level) (Sem: 3-8)
Include at least one course in each of the following areas: American, Comparative, International Relations, and Theory

Last Revised by the Department: Fall Semester 1999
Blue Sheet Item #: 28-01-056
Review Date: 11/10/03

LA

Polymer Science Minor

University Park, College of Earth and Mineral Sciences (PLMSC)
Robert Kimel, Associate Head Materials Science and Engineering
The goal of the polymer science minor is to produce graduates who have a first-hand knowledge of the relationships between the synthesis, structure, properties and processing of polymer materials. Students are required to take MATSE 443 (3 credits), MATSE 414, MATSE 445; MATSE 446; MATSE 447 which provides a broad overview of the subject, then select 3 credits chosen from a suite of courses that deal with polymer synthesis, microstructure and morphology, properties and processing.
A grade of C or better is required for all courses in the minor.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 23 credits
PRESCRIBED COURSES (8 credits)
CHEM 210(3), MATH 231(2), MATSE 443(3) (Sem: 5-8)
ADDITIONAL COURSES (15 credits)
Select 3 credits from: BM E 474(3), EMCH 446(3), MATSE 447(3), MATSE 473(1), MATSE 474(1), MATSE 494W(1), and MATSE 496(1-3) (Sem: 5-8)
Select 12 credits from: MATSE 441(3), MATSE 442(3), MATSE 444(3), MATSE 445(3), or MATSE 446(3) (Sem: 5-8)

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-01-061A
Review Date: 8/25/2015
UCA Revision #1: 9/1/06
EM

Poultry and Avian Science Minor

University Park: College of Agricultural Sciences (P A S)
The Poultry and Avian Science minor is designed for students who wish to supplement their academic major with studies focused on the biology, and management, of avian species, with an emphasis on domestic fowl. In recognition of the diverse career opportunities in the modern poultry and game bird industries, the minor is designed to also accommodate students with primary interests in agribusiness management, food science, and wildlife science. Students are required to complete a minimum of 29 credits (9 credits at the 400 level). AN SC 211, AN SC 311, and AN SC 425(VB SC 425) provide a foundation of knowledge pertaining to both avian sciences and the commercial poultry industry, while additional courses selected by the student will allow for further specialization in the foundation animal science disciplines, agribusiness management, food science, and wildlife and fisheries science. In addition, credits from poultry or avian internship experiences and/or independent study projects may also be applied towards meeting the requirements of the minor.
The University's Poultry Education and Research Center is used extensively for supplementing classroom work with hands-on laboratories. The flexibility of the minor permits program planning commensurate with an individual's interests and professional goals, and should enhance the student's ability to compete for related positions in industry, government, or academia (graduate or professional school).
The prerequisites for the minor's prescribed courses are BIOL 110 (for AN SC 211), AN SC 100 (for AN SC 311), and AN SC 425(VB SC 425) provide a foundation of knowledge pertaining to both avian sciences and the commercial poultry industry, while additional courses selected by the student will allow for further specialization in the foundation animal science disciplines, agribusiness management, food science, and wildlife and fisheries science. In addition, credits from poultry or avian internship experiences and/or independent study projects may also be applied towards meeting the requirements of the minor.
A grade of C or better is required for all courses in the minor.
Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
PRESCRIBED COURSES (9 credits)
AN SC 211(3) (Sem: 1-4)
AN SC 311(3) (Sem: 5-7)
AN SC/VB SC 425(3) (Sem: 6-8)

**ADDITIONAL COURSES** (9 credits)
Select 3 credits from: AG BM 302(3), AG BM 338(3), AN SC 207(2), AN SC 208(1) (Sem: 3-6)
AN SC 300 GN(3), AN SC 301(3), AN SC 322(3), AN SC 395(1-3) [*], W F S 300(2), W F S 301(2) (Sem: 5-8)

[*] AN SC 395 and AN SC 496 must have a poultry or avian biology emphasis.

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-06-002

Review Date: 04/05/2016

AG

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**Product Realization Minor**

*University Park, College of Engineering (PRODR)*

This 21-credit interdisciplinary minor is designed for any engineering student who is interested in state-of-the-art practice in integrated product/process design and manufacturing. The program culminates with a one-semester project involving the design and manufacture of a new product.

The purpose of the minor is to offer students state-of-the-art practice in integrated product/process design and manufacturing. Students completing the minor should:

- understand the interaction of design and manufacturing through practical examples;
- be familiar with the entrepreneurial skills needed to transfer a new product from initial idea to market;
- understand the technical and management aspects of concurrent engineering and total quality management; and
- have hands-on experience in designing and manufacturing a product, organizing and managing the effort, and interacting with the customer.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**REQUIREMENTS FOR THE MINOR:** 21 credits

**PRESCRIBED COURSES** (9 credits)
M E 240(3) (Sem: 1-4)
ENGR 407(3) (Sem: 5-6)
I E 466(3) (Sem: 5-8)

**ADDITIONAL COURSES** (12 credits)
Select a 3-credit senior project: team-based design or industrial projects course, as approved by the coordinator (Sem: 7-8)

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-01-138

Review Date: 8/29/06

UCA Revision #2: 7/30/07

EN

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**Recreation, Park, and Tourism Management Minor**

*University Park, College of Health and Human Development (RPTM)*

**Contact:** Meredith Chaney, [mac178@psu.edu](mailto:mac178@psu.edu); 814-863-9776

The minor in Recreation, Park, and Tourism Management provides an introduction to recreation/leisure services, and emphasizes professional skills essential for successful delivery of these services. Examples of settings offering recreation/leisure services include resorts, theme parks, convention centers, sports and fitness facilities, private corporations, nonprofit agencies, governmental agencies (municipal, state, and federal levels), armed services, colleges and universities, correctional facilities, camps, public parks, nature centers, hospitals and other health care agencies.

Students who minor in Recreation, Park, and Tourism Management gain knowledge and competencies in recreation leadership, program development and implementation, and administration of recreation services. In addition, students
explore the relevance of recreation and leisure in their own lives. Support courses enable the student to focus on specialized services, such as commercial recreation and tourism, community recreation, park management, environmental interpretation, or therapeutic recreation.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**REQUIREMENTS FOR THE MINOR:** 20 credits

**PRESCRIBED COURSES** (14 credits)
- RPTM 101(2), RPTM 120 GS(3) (Sem: 1-4)
- RPTM 236(3), RPTM 356(3), RPTM 410(3) (Sem: 3-6)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
Select 6 credits three of which must be from 400-level RPTM courses (Sem: 5-8)

Last Revised by the Department: Fall Semester 2004
Blue Sheet Item #: 32-06-123A
Review Date: 02/25/05
HH

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**Religious Studies Minor**

*Abington University Park, College of the Liberal Arts (RL ST)*

The minor in Religious Studies requires 18 hours of course work in RL ST. It (1) acquaints the student with the methods for studying religion (how one studies a religion), (2) provides an elementary introduction to the world's main religious traditions (names, dates, ideas, similarities and differences), and (3) offers the opportunity to investigate a particular topic or religion in greater detail. Students are required to take one survey course (either RL ST 001, RL ST 003, or RL ST 004), which provides a broad historical overview of several religions, from their foundation to the present day.

The interaction between religions and their cultural contexts is emphasized, as is the evolution of an individual religion. After this introduction, the student is free to choose from a broad array of courses on the psychological, sociological, historical, and textual aspects of religions, both living and dead, both familiar and foreign. For example, a student may study Hinduism, Islam, Christianity, Norse religion, Greco-Roman religion, or the sociological aspects of religions. Reading skills and critical thinking skills are important and will be further developed in the courses.

The minor is excellent preparation for a career in the professions (law, medicine), and many students use this classical humanities topic to augment a major in the pure sciences.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**

**REQUIREMENTS FOR THE MINOR:** 18 credits

**ADDITIONAL COURSES** (3 credits)
Select 3 credits from RL ST 001 GH;US;IL(3), RL ST 003 GH;US;IL(3), or RL ST 004 GH;US;IL(3) (Sem: 1-6)

**SUPPORTING COURSES AND RELATED AREAS** (15 credits)
Select 15 credits (at least 6 credits at the 400-level) in Religious Studies (Sem: 3-8)

Last Revised by the Department: Summer Session 1995
Blue Sheet Item #: 23-06-147
Review Date: 3/11/03
LA

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**Rhetoric Minor**

*University Park, College of the Liberal Arts (RHET)*

The Rhetoric Minor provides undergraduate students an opportunity to acquire special competence in the history, theory, and criticism of civic discourse and cultural practices. It brings together courses from both the Department of English and the Department of Communication Arts and Sciences, from which students may learn about the nature and function of rhetoric in politics, the professions, the classroom, and the media. The list of course offerings is designed to feature applied as well as theoretical approaches, and allows students to explore the subject in breadth as well as depth. Students completing the minor will command a greater knowledge of an appreciation for the significance of rhetoric as a central component of civic life.

A grade of C or better is required for all courses in the minor.

**Scheduling Recommendation by Semester Standing given like (Sem: 1-2)**
REQUIREMENTS FOR THE MINOR: 18 credits
A minimum of 6 credits at the 400 level; maximum of 6 credits may be double-counted.

PRESCRIBED COURSES (6 credits)
CAS 201(3), ENGL 471(3) (Sem: 3-8)

ADDITIONAL COURSES (9 credits)
Select 9 credits from the following course list:

SUPPORTING COURSES AND RELATED AREAS (3 credits)
Select 3 credits from the following course list in consultation with adviser:
CAS 499 IL(3) or ENGL 499 IL(3), LA 495(3), CAS 494H(3) or ENGL 310H(3), ENGL 487W(3) (Sem: 5-8)

Last Revised by the Department: Summer Session 2007
Blue Sheet Item #: 35-05-117
Review Date: 3/6/07
LA

Russian Area Studies Minor

The Russian Area Studies minor is an interdisciplinary program supervised by the Center for Russian and East European Studies and the Department of Slavic and East European Languages designed to combine a regional specialization with an academic disciplinary major. The minor may be combined with any undergraduate major in the University. It requires 15 credits in approved Area Studies courses (6 must be at the 400 level or above), 12 credits in beginning Russian language or the equivalent, and 6 credits of Russian language at the 200 level or above, as well as the baccalaureate degree and departmental major requirements of the student's choice.

The minor helps prepare students for further academic work in the Russian area at the graduate level or to pursue careers as area specialists in commerce, industry, journalism, education, and various governmental and international agencies.

Only courses in which the student earns a grade of C or better may be counted toward fulfillment of the requirements of the minor. The Center for Russian and East European Studies awards a certificate in Russian Area Studies to students successfully completing all the requirements of the program.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21-33 credits

ADDITIONAL COURSES (15-27 credits)
RUS 001(4), RUS 002(4), RUS 003(4) or RUS 011(6), RUS 012(6) (Sem: 1-6)
Select 6-9 credits in humanities from HIST 142 GS, IL(3), HIST 434 IL(3), RUS 141W IL(3), or RUS 142Y IL(3) (Sem: 1-8)
Select 6-9 credits in the social sciences from ECON 472 GS(3), PL SC 413(3), or PL SC 452(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits of RUS 200-level courses or above (Sem: 3-8)

Last Revised by the Department: Fall Semester 1993
Blue Sheet Item #: 21-05-022
Review Date: 10/11/04
UCA Revision #2: 7/30/07
LA

Russian Minor

The Russian minor is designed for students who want to study the language, literature, and culture of Russia. Russian is spoken through the former Soviet Union and widely understood in the countries of Eastern Europe. The Department of Germanic and Slavic Languages and Literatures offers an array of courses in Russian language, literature, and culture. Study abroad in Russia at St. Petersburg University under the University's study abroad program is available. For the Russian minor, students must accumulate 18 credits (9 of them at the 400 level) in Russian. The Russian minor leads to various employment opportunities. Recipients of the Russian minor have found employment with businesses having contact with the former Soviet Union, with various agencies of the U.S. government, in the educational, journalistic and publishing fields, and in the travel industry.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 19 credits
Russian Translation Minor

University Park, College of the Liberal Arts (RUS T)

The Russian Translation minor is designed to offer, within the context of a liberal education, specialized skills in technical translation from the Russian language. The curriculum is career-oriented and requires competence in a technical field or fields in addition to the language skill. The student will select such a field or fields in accordance with his or her special interests and in consultation both with an adviser and with persons directly involved with the field chosen.

The Department of Germanic and Slavic Languages and Literatures offers an array of courses in Russian language, literature, and culture. Study abroad in Russia at St. Petersburg University under the University's study abroad program is available. For the Russian Translation minor, students must take RUS 400, RUS 412, and an additional 12 credits of Russian, 3 at the 400 level and 9 at the 200 level or higher, for a total of 18 credits.

The Russian Translation minor opens employment opportunities for its graduates in fields and professions where proficiency in one or more foreign languages is desirable or required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
RUS 400 IL(3), RUS 412 IL(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 9 credits of Russian courses at the 200 level or higher (Sem: 5-8)
Select 3 credits of 400-level Russian courses (Sem: 5-8)

Last Revised by the Department: Summer Session 2002
Blue Sheet Item #: 30-01-037
Review Date: 08/28/01
LA

Security and Risk Analysis Minor

Penn State Berks
University College: Penn State Beaver, Penn State Mont Alto, Penn State New Kensington, Penn State Worthington Scranton, World Campus

University Park, College of Information Sciences and Technology (SRA)

The minor in Security and Risk Analysis (SRA) is intended to familiarize students with the general frameworks and multidisciplinary theories that define security and related risk analysis. Course work will engage students in the challenges and problems of assuring information confidentiality and integrity (e.g., social, economic, technology, and policy issues) as well as the strengths and weaknesses of various methods for assessing and mitigating associated risk in the students' major field.

The minor provides a grounding in analysis and modeling used in information search, visualization and creative problem solving. This knowledge is set in the context of legal, ethical and regulatory issues of security including analysis of privacy and security law, internal control standards, regulatory policies and basic investigative processes and principles. Such understanding overviews the information technology that plays a critical role in identifying, preventing and responding to
security-related events in the student's major field.

A grade of C or better is required for all courses in the minor.

_Scheduling Recommendation by Semester Standing given like (Sem: 1-2)_

**REQUIREMENTS FOR THE MINOR:** 21 credits [1]
(At least 6 credits must be at the 400 level.)

**PRESCRIBED COURSES** (15 credits)
IST 110 GS(3), SRA 111 GS(3), SRA 211(3), SRA 221(3) (Sem: 1-6)
IST 452(3) (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (6 credits)
Select 6 credits in consultation with the SRA Minor adviser from the following areas: Risk Management, Network Security, or Cyber Forensics. At least 3 credits must be at the 400 level. (Sem: 5-8)

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

_Last Revised by the Department: Fall Semester 2007_
Blue Sheet Item #: 35-06-457
Review Date: 4/10/07_

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**Sexuality and Gender Studies Minor**

_University Park, College of the Liberal Arts (SGS)_

The minor in Sexuality and Gender Studies addresses human sexuality and gender as they have been conceptualized and investigated by diverse disciplines: humanities (including history and cultural studies), behavioral and social sciences, biological sciences, and visual and performance arts. Courses in the minor require students to explore scholarship and research on sexuality, sexual orientation, and gender across the lifespan, across cultures, and throughout history. Developing students' critical skills in a variety of disciplines, courses in the minor cover theories of sexuality and gender; sexual orientation; lesbian, gay, bisexual, and transgender movements; the history of sexual norms; queer theory; gender identity; and impact of gender identities and erotic orientations on the arts; etc.

A grade of C or better is required for all courses in the minor.

_Scheduling Recommendation by Semester Standing given like (Sem: 1-2)_

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (6 credits)
ENGL 245 GH;US(3) and HD FS/WMNST 250 US(3) (Sem: 1-4)

**ADDITIONAL COURSES** (12 credits)

In order to fulfill the interdisciplinary nature of the minor, students must study both in arts and humanities and in sciences. Students are required to complete a total of at least 12 credits from the two categories below: a minimum of 3 credits from humanities and the arts and a minimum of 3 credits from the sciences. Completion of the minor also requires at least 6 credits at the 400 level in either humanities and the arts or in the sciences (Sem: 1-8). With the permission of the person in charge of the minor, "Special Topics" courses may be substituted for courses listed below.

A. **Sexuality studies in humanities and the arts:**
ENGL 225 GA;GH(3), ENGL 227 GH;US;IL(3), HIST/WMNST 116 GS;US;IL(3), HIST/WMNST 166 GH;US(3), HIST/WMNST 466 US;IL(3), PHIL 014 GH;US(3), WMNST 301 GH;US;IL(3), WMNST 400 US;IL(3) (Sem: 1-8)

B. **Sexuality studies in the sciences:**

_Last Revised by the Department: Spring Semester 2015_
Blue Sheet Item #: 43-06-000
Review Date: 04/14/2015

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**Six Sigma Minor**

_University Park, College of Engineering (SIGMA)_

Six Sigma has been increasingly internalized by companies involved in manufacturing, health care, and service industries. The Six Sigma process has also been used to address environmental concerns such as water quality and energy
**Sociology Minor (SOC)**

Contact: Abington College, Manohar Singh, m.singh@psu.edu; Altoona College, Karyn McKinney, kdm12@psu.edu; Behrend College, Nicole Shoenberger, nas25@psu.edu; Capital College, Kenneth Cunningham, kuc1@psu.edu; Penn State Fayette, Russ Filburn, rrf1@psu.edu; Penn State Schuylkill, Salih Hakan Can, shc11@psu.edu; College of the Liberal Arts, Sal Oropesa, sos1@psu.edu

The sociology minor allows students to explore the wide range of topics, social groups, and social interactions studied by sociologists. From social inequalities and social problems to the familiar institutions of family, school, religion, and government, the diversity of courses available allows sociology minors to explore courses relevant to their interests. The courses also provide multiple viewpoints, studying the intimate interactions of families and small groups and the complex interactions of global economies and political alliances. Requiring a minimum of 18 credits in sociology, including Introductory Sociology (SOC 001) and two courses at the 400 level, students have flexibility in choosing a set of courses for their sociology minor.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (18 credits)

I E 305 (3), I E 322 (3), I E 323 (3) (Sem: 5-6)
I E 433 (3), I E 434 (3), I E 436 (3) (Sem: 7-8)

Last Revised by the Department: Summer Session 2009
Blue Sheet Item #: 37-06-042
Review Date: 4/14/09

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**Spanish Minor (SPAN)**

Contact: Altoona College, Roselyn Costantino, rxc19@psu.edu; Behrend College, Soledad Traverso, sxt19@psu.edu; Berks College, Rosario Torres, rz11@psu.edu; College of the Liberal Arts, Margaret (Peggy) Blue, mmb21@psu.edu

A grade of C or better is required for all courses in the minor. Courses that do not require knowledge of Spanish may not be counted toward the minor.

*Scheduling recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (6 credits)

SPAN 100(3)*, SPAN 200(3)* (Sem: 2-8)

**ADDITIONAL COURSES** (3 credits)

SPAN 215(3) or SPAN 253W(3) (Sem: 2-8)

**SUPPORTING COURSES AND RELATED AREAS** (9 credits)

Select 3 credits from the following: SPAN 210(3), SPAN 220(3), SPAN 300(3), SPAN 305(3), SPAN 353(3), SPAN 354(3), SPAN 355(3), SPAN 356(3) (Sem: 2-8)

Select 6 credits from the following: SPAN 410(3), SPAN 412(3), SPAN 413(3), SPAN 414(3), SPAN 415(3), SPAN 418(3), SPAN 420(3), SPAN 439(3), SPAN 440(3), SPAN 472(3), SPAN 476(3), SPAN 490(3), SPAN 491(3), SPAN 497(3) (Sem: 5-8)

SPAN 199, 299, 399, and 499 (Study Abroad - Spanish) and SPAN 197, 297, 397, 497 (Special Topics Courses) may also
be applied to the Spanish minor and will be substituted for the appropriate course by the Spanish minor advisor. All courses taken abroad must be taught in Spanish.

NOTE: SPAN 130, 131, 230, 231 and any course that does not require a knowledge of Spanish. DO NOT count toward the Spanish minor.

* Heritage speakers (students with Spanish language in family background) and native speakers of Spanish should take SPAN 100A and SPAN 301 instead of SPAN 100 and SPAN 200. May not take SPAN 410.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-06-146
Review Date: 04/10/2012

Special Education Minor

Penn State Berks - Carole Roberts, ckr10@psu.edu
University Park, College of Education (SPLED)

PROFESSOR Paul Riccomini, Program Coordinator
PROFESSOR Paul Riccomini, in charge of major
PROFESSOR David McNaughton, in charge of minor

This minor provides undergraduate students with the opportunity for concentrated work in instructional practices to support the achievement of students with special education needs in general education classrooms. Students will learn strategies for creating a positive classroom environment that will promote student growth and achievement, effective instructional practices for students with special education needs, and techniques for assessing the academic progress of students. The targeted instructional practices have been demonstrated to be effective both with students with and those without special education needs.

The minor in Special Education responds to the growing need to provide appropriate instructional services to students with special education needs in general education classrooms.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 24 credits

PRESCRIBED COURSES (12 credits)
EDPSY 014(3) (Sem: 1-4)
SPLED 400(4), SPLED 419(2), SPLED 461(3) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
EDPSY 010 GS(3), HD FS 229 GS(3) or HD FS 239 GS(3) (Sem: 1-4)
SPLED 403A(3) or SPLED 403B(3) (Sem: 5-8)
Select 6 credits from CSD 146 US;IL(3), CSD 218(3), CSD 269 GS;US;IL(3), CSD 300 US;IL(3), RHS 100 GS;US;IL(3), RHS 402(3), or RPTM 277 US(3) (Sem: 5-8)

Last Revised by the Department: Spring Semester 2013
Blue Sheet Item #: 41-05-084
Review Date: 02/19/2013

Statistics Minor

University Park, Eberly College of Science (STAT)

The Statistics minor introduces students to the quantitative aspects of research. Understanding statistics is useful for research in many areas including agriculture, business, education, social science and sciences as well as many jobs in industry and government.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 21 credits

PRESCRIBED COURSES (9 credits)
MATH 140 GQ(4), MATH 141 GQ(4) (Sem: 1-2)
STAT 480(1) (Sem: 5-8)

ADDITIONAL COURSES (12 credits)
Select 6 credits from STAT 318(3) and STAT 319(3) or STAT 414(3) and STAT 415(3) (Sem: 3-8)
Select 6 credits from STAT 416(3), STAT 440(3), STAT 461(3), STAT 462(3), STAT 463(3), STAT 464(3), or STAT 466(3)
Supply Chain and Information Sciences and Technology Minor

University Park: Smeal College of Business and College of Information Sciences and Technology (SCIST)

The minor in SCIST is structured to provide students not majoring in Supply Chain & Information Systems (SC&IS) or Management Information Systems (MIS) with the opportunity to develop working knowledge of information technology, supply chain management, and their interdisciplinary synergies. The joint minor is designed for professional careers in business, information systems, software development, consulting, and government. The successful minor must, at a minimum, possess basic knowledge of quantitative techniques, computer applications, and microeconomics.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (12 credits)
IST 110 GS(3), IST 210(3), IST 220(3) (Sem 1-7)
SCM 301(3) (Sem: 5-6)

ADDITIONAL COURSES (6 credits)
Select 6 credits from SCM 404(3), SCM 405(3), SCM 406(3) (Sem: 6-8)

Supply Chain and Information Systems Minor

World Campus, Smeal College of Business (SC&IS)

The Supply Chain and Information Systems (SC&IS) minor is structured to provide the student with a working knowledge of the discipline and to complement a student’s major field of study. The SC&IS minor provides exposure to core supply chain processes, methods, and techniques and to directly related enabling enterprise system technologies. Students completing the SC&IS minor can apply their expanded knowledge in both manufacturing and service sectors of the economy.

The SC&IS minor is offered on-line through World Campus. SC&IS contains World Campus sections of MIS 404, SCM 445 and SCM 465 that contain SAP-specific topics necessary for the minor. Planning and course selection is important in order to earn proper credit in the SAP-specific courses. The SC&IS minor is not open to SC&IS major (Smeal) and PSCM majors (Behrend and Capital).

A grade of C or better is required in all courses used to meet the requirements of the SC&IS minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES: (12 credits)
SCM 301(3), SCM 404(3), SCM 406(3), SCM 445(3) (Sem: 4-7)

ADDITIONAL COURSES: (6 credits)
Select 6 credits from the following: MIS 404(3), SCM 460(3), SCM 465(3) (Sem: 5-8)

Sustainability Leadership

Intercollege Program (SUSLD)
The Intercollege Minor in Sustainability Leadership has been designed for students who wish to promote environmental, social, and economic sustainability in their personal and professional lives. Administered by a University-wide faculty committee, the program provides an opportunity for students in any academic major to develop key competencies that will be the foundation for their growth as sustainability leaders in their civic and professional endeavors. Students will cultivate these sustainability leadership competencies in the context of thematic tracks that allow them to focus on particular topics within sustainability studies. The competencies cut across all thematic tracks so that all students in the minor will develop capabilities in: systems thinking; application of sustainability concepts, metrics and analysis; ethics; self-knowledge and leadership; change agency; and collaboration. While these competencies are developed in the context of a specific thematic track, they are transferrable to numerous settings and problems, and graduates of the Sustainability Leadership program will be able to apply them to ethical, social, business and civic issues that they encounter after leaving the University.

All students in the minor are required to take the introductory course, Foundations of Leadership in Sustainability (SUST 200). Within each thematic track, students select twelve credits related to the chosen theme in sustainability leadership. These must include three credits of approved leadership coursework (scholarly explorations of leadership concepts related to the chosen theme) and three credits that offer an immersive experience in sustainability (that is, an opportunity to engage, observe and learn in depth about sustainability challenges and solutions related to the student’s chosen theme). The final three credits for each student in the minor is the 400-level Sustainability Leadership Capstone experience. Capstone selection is in consultation with the student’s major advisor, the minor advisor or coordinator, and the course instructor. The capstone coursework must be relevant to the chosen theme, must have an approved capstone project that includes scholarly applied or theoretical research on a current issue in sustainability leadership, and must include a critical synthesis of the student’s minor curriculum and an articulation of its crosscutting themes.

Design for Sustainable Communities Track
This track allows students to investigate sustainability and leadership in community and urban planning; courses focus on both technical design and community development.

Educating for Sustainability Track
This track provides students with the opportunity to explore a variety of approaches to sustainability education and leadership in sustainability.

Humanistic Understanding of Sustainability Track
Through reading and analysis of significant sustainability-focused texts in philosophy, history, literature, and the social sciences students delve into the evolution and history of thinking on sustainability and leadership in sustainability.

Sustainability and Food Systems Track
Students in this track learn about the nature of food and sustainable food systems, and about sustainability policy and leadership issues related to food, including food security, sustainable production practices, distribution, and safety.

Applicants to the minor present a proposed plan of study for the chosen minor track. The proposed plan of study must be approved by the student’s major faculty advisor and by the minor advisor. Entrants to the minor are required to have declared a major field of study.

New Sustainability Leadership minor tracks will be developed over time, and students are encouraged to consult with the minor coordinator early in their program planning, in order to be aware of upcoming additions to the curriculum. In exceptional cases, and by written approval of the program coordinator and major advisor, students may propose a specialized track of their own design.

Students may apply toward the minor no more than six credits from their major requirements and no more than six credits from their other minor requirements. The Sustainability Leadership Capstone credits may not be used simultaneously to fulfill capstone or thesis requirements for any other degree program. All minor programs must include at least six credits at the 400 level. A grade of C or higher is required for all courses in the minor.

REQUIREMENTS FOR THE MINOR: 18 credits [1]

PRESCRIBED COURSES (3 credits)
SUST 200(3) (Sem: 2-6)

ADDITIONAL COURSES (6 credits)
Take the following 6 credits, or approved substitutions, in consultation with the minor advisor:
SUST 296 or 496, or approved substitution that provides an immersive sustainability experience (3) (Sem: 5-7)
SUST 496 or approved substitution that offers a capstone project in sustainability leadership (3) (Sem: 7-8)

SUPPORTING AND RELATED COURSE AREA (9 credits)
Allowable courses in this area vary by Sustainability Leadership Thematic Track. See Specifics below. 

At least three credits from the Additional Courses or the Supporting Courses must be from outside the student’s major department.

Requirements for Sustainability Leadership Minor Thematic Tracks

Design for Sustainable Communities Track
(Allowable courses in this area vary by Sustainability Leadership Thematic Track. See specific below.

Select 6 credits from the following course list, or approved substitutions (6 credits)
CED 410W Sustainable Residential Subdivision (3)
CED 152 Community Development Concepts and Practice (3)
CED 309 Land Use Dynamics (3)
CED 409 Land Use Planning and Procedure (3)
CED 427W Society and Natural Resource (3)
ENVE 460 Environmental Law (3)
GEOG 120 (GS;US;IL) Urban Geography: A Global Perspective (3)
GEOG 429 (US;IL) Geographic Perspectives on Global Urbanization (3)
GEOG 436 Ecology, Economy, and Society (3)
GEOG 439 Property and the Global Environment (3)
LARCH 065 (GA;US;IL) Built Environment and Culture (3)
LARCH 241 Ecological Principles for Landscape (3)
LARCH 311 Design and Theory III: Regional Planning and Landscape Systems (4)
SOILS 422 Natural Resources Conservation and Community Sustainability (3)

Select one of the following leadership courses or approved substitutions, in consultation with the SUSLD advisor (3 credits)
AEE 465 Leadership Practices: Power, Influences, and Impact (3)
ARCH 412 Integrative Energy and Environmental Design (3)
CED 375H Community, Local Knowledge, and Democracy (3)
CEDEV 452 Community Structure, Processes and Capacity (3)

Educating for Sustainability Track

Select 6 credits from the following course list, or approved substitutions (6 credits):
AEE 350 Teaching Methods for Agricultural and Environmental Laboratories (3)
AEE 400 Global Agriculture Education (3)
AEE 412 Methods of Teaching Agriculture and Environmental Science (4)
AEE 450 Program Design and Delivery (3)
EDTHP 440 (CI ED 440) Introduction to Philosophy of Education (3)
RPTM 325 Principles of Environmental Interpretation (3)
RPTM 430 Environmental Education Methods and Materials (3)

Select 3 credits from the following leadership courses, or approved substitution, in consultation with the SUSLD advisor (3 credits)
AEE 201 (GS) Interpersonal Skills for Tomorrow's Leaders (3)
AEE 311 Developing Youth Leadership through Organization and Program Structure (3)
AEE 465 Leadership Practices: Power, Influences, and Impact (3)
EDLDR 409 Leadership Studies in Popular Film (3)
EDLDR 480 Introduction to Educational Leadership (3)
PHIL 119 (GH) Ethical Leadership (3)
RPTM 236 Leadership and Group Dynamics in Recreation Services (3)
SOC 469 Techniques in Small Group Facilitation (1-4)

Humanistic Understanding of Sustainability Track

Select 6 credits from the following course list, or approved substitutions (6 credits):
CMLIT 435 (IL) Cultures of Globalization (3)
CMLIT 455 (IL) Ethics, Justice, and Rights in World Literature (3)
ENGL 180 (GH) Literature and the Natural World (3)
ENGL 181A (GH;US) Adventure Literature: Exploring the Chesapeake Bay (4.5)
ENGL 181B (GH;US) Adventure Literature: Exploring Cape Cod (4.5)
ENGL 181C (GH;US) The Beach: Exploring the Literature of the Atlantic Shore (4.5)
ENGL 181D (GH;US) Adventure Literature: Exploring the Literature of American Wilderness (3)
ENGL 424 Creative Writing and the Natural World (3)
ENGL 430 American Renaissance (3)
HIST 109 (GH;US) Introduction to U.S. Environmental History (3)
HIST 110 (GH;IL) Nature and History (3)
HIST 111 (GH;US) American Food System: History, Technology, and Culture (3)
HIST 151 (GS;US) (S T S 151) Technology and Society in American History (3)
HIST 453 American Environmental History (3)
PHIL 013 (GH) Philosophy, Nature, and the Environment (3)
PHIL 118 (GH) Introduction to Environmental Philosophy (3)
PHIL 403 Environmental Ethics (3)

Select 3 credits from the following leadership courses, or approved substitution, in consultation with the SUSLD advisor (3 credits)
CAS 404 Conflict Resolution and Negotiation (3)
CAS 409 (PL SC 409) Democratic Deliberation (3)
PHIL 119 (GH) Ethical Leadership (3)
PL SC 112 (GS) Ethics in Citizenship, Politics, and Government (3)
PUBPL 305 Leadership Studies (3)

Sustainability and Food Systems Track

Select one of the following food/nutrition courses, or approved substitutions (3 credits):
NUTR 251 (GHA) Introductory Principles of Nutrition (3)
FD SC 406 Physiology of Nutrition (3)

Select one of the following food system courses, or approved substitutions (3 credits):
AG BM 102 Economics of Food Systems (3)
AGECO 134 (GN) (R SOC 134) Sustainable Agriculture Science and Policy (3)
AGECO 144 (GN) Principles and Practices of Organic Agriculture (3)
ERM 210 (GN) Environmental Factors and Their Effect on Your Food Supply (3)
HIST 111 (GH; US) (NUTR 111) American Food System: History, Technology, and Culture (3)
NUTR 430 Global Food Strategies: Problems and Prospects for Reducing World Hunger (3)

Select 3 credits from the following leadership courses, or approved substitution, in consultation with the SUSLD advisor (3 credits)
AEE 201 (GS) Interpersonal Skills for Tomorrow’s Leaders (3)
AEE 465 Leadership Practices: Power, Influences, and Impact (3)
PHIL 119 (GH) Ethical Leadership (3)
PL SC 112 (GS) Ethics in Citizenship, Politics, and Government (3)
RPTM 236 Leadership and Group Dynamics in Recreation Services (3)

Last Revised by the Department: Fall Semester 2015
Blue Sheet Item #: 44-02-000
Review Date: 10/13/2015

Teaching English to Speakers of Other Languages Minor

University Park, College of the Liberal Arts (TESOL)
The minor in Teaching English to Speakers of Other Languages (TESOL) provides students, regardless of academic major, with basic professional knowledge and skills in the teaching of English as a second language (ESL) in adult programs in the United States and English-as-a-foreign-language (EFL) in settings abroad. It is also excellent preparation for graduate work in TESOL and Applied Linguistics.

The program of study includes an introduction to the study of language use, culture, and social interaction from a variety of perspectives, to the role of English in globalization processes and to how globalization changes the structure, norms, and usage of English. It also provides students with an overview of current theories and practices in the teaching of English language and culture, and practical experiences in and basic tools for planning, delivering, and evaluating instruction.

Individuals who obtain a minor in TESOL may participate in one of the teaching exchanges sponsored by the Department of Applied Linguistics upon graduation. They may also find teaching positions in private language institutes or as private language tutors in the United States and abroad and well as through organizations such as the Peace Corps and the Fulbright Exchange.

This minor does not duplicate other undergraduate degree programs within the department, college or university. It may be pursued concurrently with any undergraduate major.

The minor consists of 18 credit hours. All students are required to take four three-credit courses, for a total of 12 credits in the study of language use, culture and interaction, English as a global language, functional grammar and teaching methods.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

Requirements for the Minor: 18 credits

Prescribed Courses (12 credits)
APLNG 200 GH; IL(3), APLNG 210(3), APLNG 484(3), APLNG 493 IL(3) (Sem: 2-8)

Additional Courses (6 credits)
Select 6 credits from the following:
APLNG 083S GS; US; IL(3), APLNG 410(3), APLNG 412(3), APLNG 482Y IL(3), APLNG 491 (3) (Sem 1-8)

Last Revised by the Department: Summer Session 2009
Blue Sheet Item #: 37-03-029
Review Date: 11/18/08

Technical Writing Minor (TEHWR)

Contact: College of the Liberal Arts, Elizabeth Brown, eaf4@psu.edu

The Department of English offers an 18-credit minor leading to a Technical Writing certificate to all students, regardless of major or college, who want to do concentrated work in technical writing.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

Requirements for the Minor: 18 credits

Prescribed Courses (3 credits)
ENGL 418(3) (Sem: 5-8)
ENGL 418(3) (Sem: 5-8)

ADDITIONAL COURSES (12-15 credits)
(Some courses in this category may have prerequisites that are not required in the minor.)
Select 3-6 credits from CAS 452(3), ENGL 470(3), ENGL 471(3), ENGL 472(3), ENGL 473(3), ENGL 474(3), S T S 407(3) (Sem: 3-8)
Select 6-9 credits from ENGL 415(3), ENGL 416(3), ENGL 417(3), ENGL 421(3), ENGL 495(3) (Sem: 3-8)
Select 3-6 credits from GD 201(3), INSYS 412(3), INSYS 413(3), INSYS 441(3), PSYCH 444(3), PSYCH 456(3) (Sem: 3-8)

SUPPORTING COURSES AND RELATED AREAS (0-3 credits)
(Some courses in this category may have prerequisites that are not required in the minor.)

Last Revised by the Department: Fall Semester 1996
Blue Sheet Item #: 25-01-033
Review Date: 4/9/02
UCA Revision #1: 9/1/06

Theatre Minor

Penn State Berks - James Brown, jnb20@psu.edu
University College, Penn State Schuylkill, Penn State York
University Park, College of Arts and Architecture (THEA)

The Theatre minor is designed to be an enhancement to a major area of study and/or personal enrichment. The minor should be particularly attractive to students in the humanities (English), communication (Film, Journalism), and the arts (Music, Architecture). The minor may also be attractive to students who need to demonstrate a wide range of interests.

The Theatre minor requirements total 18 credits. Theatre 100 GA;US;IL, a required course in the minor, is an experiential survey of all aspects of the living theatre, as presented by a resident company of theatre artists. Theatre 410, an advanced script analysis course, is also required. Students choose one course from the approved list of theatre history courses and one course from the approved list of design/technical courses. These supporting courses place the literature and aesthetic in historical, social, and political perspective. Students elect 6 theatre credits as additional courses. Typical supporting courses include: Theatre 102 GA, fundamentals of acting; THEA 208 GA;US;IL, Workshop: Theatre in Diverse Cultures; and advanced design or theatre history classes.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
PRESCRIBED COURSES (3 credits)
THEA 410(3) (Sem: 5-8)

ADDITIONAL COURSES (9 credits)
THEA 100 GA;US;IL(3) or THEA 105 GA(3) (Sem: 1-2)
Select 3 credits from THEA 130(3), THEA 131(3), or THEA 150(3) (Sem: 1-4)

SUPPORTING COURSES AND RELATED AREAS (6 credits)
Select 6 credits of THEA courses (Sem: 3-8)

Last Revised by the Department: Fall Semester 2005
Blue Sheet Item #: 33-04-018
Review Date: 5/2/07

Wildlife and Fisheries Science Minor

University Park, College of Agricultural Sciences (W F S)

The Wildlife and Fisheries Science minor provides non-majors with an introduction to the principles and practices of wildlife and fisheries conservation, research, and management. Although the minor includes both wildlife and fisheries course offerings, courses may be selected to provide a focus in one area or the other.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 22 credits
**Women’s Studies Minor (WMNST)**

Contacts: Abington College, Tom Smith, trs8@psu.edu; Altoona College, Le Ann De Reus, lad12@psu.edu; Penn State Behrend College, Dr. Sarah Whitney, sew17@psu.edu; Berks College, Laurie Grobman, leg8@psu.edu; Penn State Brandywine, Phyllis Cole, pbc2@psu.edu; Penn State DuBois, Jacquelyn Atkins, jka1@psu.edu; Penn State Mont Alto, Alice Royer, axr24@psu.edu; College of the Liberal Arts, Mindy Boffemmyer, mub21@psu.edu; Penn State York, Dr. Deborah Eicher-Catt, die4@psu.edu

This interdisciplinary minor is designed to develop a broad understanding of the study of women and women's perspectives in all areas of academic scholarship. The primary focus is on feminist analyses of women's lives, women's social, cultural, and scientific contributions, and the structure of sex/gender systems. The interdisciplinary and inclusive nature of the field is reflected in a curriculum that includes courses cross-listed with a wide variety of departments, courses that deal with aspects of women's lives throughout history, and courses that recognize the diversities of culture, race, religion, ethnicity, age, disability, and sexual orientation. The Women's Studies minor emphasizes the development of critical and analytical skills, creative approaches to problem solving, and the ability to articulate productive alternatives.

Women's Studies minors have a definite career advantage, and can be successful in a wide variety of career paths. Some of these include legal advocacy, counseling, journalism, public relations, management, nonprofit administration, teaching, medicine, politics, or art. In addition, many alumnae/i are currently studying in professional, law, or graduate schools.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (3 credits)
WMNST 301 GH(3) (Sem: 1-4)

**ADDITIONAL COURSES** (3 credits)
WMNST 100 GS;US;IL(3) or WMNST 106 GS;US;IL (Sem: 1-4)

**SUPPORTING COURSES AND RELATED AREAS** (12 credits)
Select 12 credits in Women's Studies or from the program-approved list; at least 6 credits must be at the 400-level --3 credits from each of the following categories: (Sem: 1-8)

- a. arts or humanities
- b. natural or social sciences
- c. focusing on non-Western women or on women of color in the United States

Last Revised by the Department: Spring Semester 2002

Blue Sheet Item #: 30-02-008A

Review Date: 6/29/05

**World Literature Minor**

*University Park, College of the Liberal Arts (W LIT)*

The minor in World Literature enables students to create a package of literature courses tailored to their interests. It offers an international approach to the study of literatures and cultures around the globe. A Senior Seminar is the culminating course. Education abroad can be included in this minor.

A grade of C or better is required for all courses in the minor.

*Scheduling Recommendation by Semester Standing given like (Sem: 1-2)*

**REQUIREMENTS FOR THE MINOR:** 18 credits

**PRESCRIBED COURSES** (3 credits)
CMLIT 400Y IL(3) (Sem: 5-8)

**ADDITIONAL COURSES** (3 credits)
CMLIT 010 GH;IL(3) or CMLIT 100 GH;IL(3) (Sem: 1-4)
Youth and Family Education Minor

University Park, College of Agricultural Sciences (YFE)

The Youth and Family Education minor is an interdisciplinary program of study designed to prepare students for work in the Penn State Cooperative Extension or other nonformal education programs.

The minor offers course work from several disciplines and addresses student needs in areas such as nonformal education methods, adult education, leadership, youth programs, and communication methods and media. A period of internship or field experience is required. To complete a bachelor's degree with a minor in Youth and Family Education, a student is required to complete 18 credits from a list of recommended courses. The core program consists of 15 credits. Students are expected to strengthen their expertise by taking at least 3 additional credits from the courses recommended.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (15 credits)
AEE 450(3), AYFCE 455(3), AYFCE 495(6), R SOC 305W(3) (Sem: 5-8)

SUPPORTING COURSES AND RELATED AREAS (3 credits)
ADTED 460(3), AEE 440(3), AYFCE 295(1-2), AYFCE 496(1-3), or AYFCE 497(1-9) (Course selection may be influenced by experience and educational background of the student. Individual programs are set jointly by the student and the program committee chair.) (Sem: 1-8)